Health and Safety Plan

Falcon Refinery Superfund Site

Ingleside, San Patricio County, Texas

Prepared for:

National Oil Recovery Corporation
3717 Bowne Street
Flushing, NY 11354

Prepared by:

505 East Huntland Drive, Suite 250
Austin, Texas 78752

Stephen Halasz, Project Manager

August 2011

TABLE OF CONTENTS

Page

1.0 INTRODUCTION

This Health and Safety Plan (HASP) outlines the health and safety requirements for on-site activities associated with soil and groundwater investigation activities within National Oil Recovery Corporation's (NORCO's) former Falcon Refinery located 1.7 miles southeast of State Highway 361 near the intersection of FM 2725 and Bishop Road near Ingleside, San Patricio County, Texas (the Site). The Site is bordered by wetlands to the northeast and southeast, residential areas to the north and southwest, an abandoned refinery to the northwest, and a construction company to the southwest.

This HASP has been developed in conformance with the directives and requirements of the TRC *Health and Safety Policy and Procedure Manual*, October 2010, and 29 CFR 1910.120(i)(2). This HASP and any subsequent addenda will apply to all TRC personnel and subcontractors who are involved with on-site activities at the Site. By implementing this plan, TRC does not assume any liability for the health and safety of non-TRC personnel involved in the activities performed during this project.

TRC field personnel and TRC subcontracted field personnel must participate in medical monitoring, respirator fit testing, and hazardous waste training programs as specified by Occupational Safety and Health Administration (OSHA) regulations (per 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response [HAZWOPER]).

All work must be conducted in compliance with applicable OSHA regulations, including 29 CFR 1910 (General Industry Standards) and 29 CFR 1926 (Construction Industry Standards).

2.0 ADMINISTRATIVE INFORMATION

Site Name: Falcon Refinery Superfund Site

Site Location: Ingleside, San Patricio County, Texas

Project Title: Phase II Remedial Investigation/Feasibility Study

Client: National Oil Recovery Corporation

Project Manager: Stephen Halasz

TRC Task Leader(s):

Corporate Health & Safety Officer (CHSO): Ron Severson

Health & Safety Coordinator (HSC): Matt Webre

Assistant Project Manager: TBD

Field/Site Health & Safety Officer (SHSO): Alonzo Arredondo

2.1 Health and Safety Plan Requirement Rationale

This HASP is required due to past and present conditions, which may have existed at the Site. The chemicals of potential concern (COPCs) include metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and pesticides/herbicides.

2.2 Health and Safety Plan Approval

Health & Safety Officer: Matt Webre

Signature: _____ Date: _____

3.0 PROJECT DESCRIPTION

The following sections describe the Site, specifically the areas of concern (AOCs), and proposed field activities.

3.1 Facility Description

The Site consists of a refinery which operated intermittently and is currently inactive. When in operation, the refinery had a capacity of 40,000 barrels per day and the primary products consisted of naphtha, jet fuel, kerosene, diesel, and fuel oil.

3.1.1 Areas of Concern

Seven AOCs have been identified as potential areas impacted by COPCs. Three AOCs are identified on-site and four are off-site. The AOCs are summarized in Table 1 and shown on Figure 1.

AOC-1 Former Operational Units

AOC-1N and AOC-1S includes the entire North site, former operational units (OU) areas of the South site, a drum disposal area, and an area where metal waste was discarded. Preliminary COPCs to be screened at this AOC included metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Potentially affected media include soil and groundwater.

AOC-2 On-Site Non-Operational Areas

Areas of the refinery not used for operations or storage and with no record of releases are included in AOC-2. Although no COPCs were anticipated in AOC-2, the screened COPCs included metals, VOCs, and SVOCs. Potentially affected media include soil and possibly groundwater.

AOC-3 Wetlands

Included in AOC-3 are wetlands immediately adjacent to the site bordered by Bay Avenue, Bishop Road, and a dam on the upstream side; wetlands located between Bishop Road, Sunray Road, Bay Avenue, and residences along Thayer Avenue; and wetlands between Sunray Road, residences along FM 2725, Gulf Marine Fabricators, Offshore Specialty Fabricators, and the outlet of the wetlands into the Intracoastal Waterway.

There is one active and several abandoned pipelines leading from the refinery to the current and historic barge dock facilities. During June 2006, the abandoned pipelines

were cut, the contents of the pipelines were removed, and plates were welded on the pipeline ends to seal them.

Wetland assessment activities will evaluate releases from the refinery, including any unpermitted wastewater effluent discharges, two known pipeline releases, and possible releases from pipelines leading from the refinery to the current and historic barge dock facilities.

There have been documented spills of hydrocarbons, waste and volatile organics. As a result, the screened COPCs at this AOC included metals, VOCs, SVOCs, PCBs, herbicides, and pesticides. Potentially affected media include sediment, soil, surface water and groundwater.

AOC-4 Current Barge Docking Facility

Included in AOC-4 is the current barge docking facility, which is approximately 0.5 acres and is located on the Intracoastal Waterway. The fenced facility, which is connected to the refinery by pipelines, is used to load and unload barges. Historically, crude oil and refined products were loaded and unloaded at this docking facility.

There have been no reported releases nor is there evidence of spills associated with this AOC. The screened COPCs at this AOC included metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Potentially affected media include soil and possibly groundwater.

AOC-5 Intracoastal Waterway

Sediments and surface water adjacent to the current and historic barge dock facilities are included in this AOC. The screened COPCs at this AOC are metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Potentially affected media include sediment and surface water. Samples will be obtained from a boat.

AOC-6 Thayer Road

Included in this AOC is the neighborhood along Thayer Road, located north of Bishop Road across from the refinery (AOC-1S). The screened COPCs at this AOC are metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Potentially affected media include soil and groundwater. No sampling is required within AOC-6 at this time.

AOC-7 Bishop Road

Included in this AOC is the neighborhood along Bishop Road, located south of Bishop Road across from AOC-1N. The screened COPCs at this AOC include metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Potentially affected media include soil and groundwater. No sampling is required within AOC-6 at this time.

3.2 TRC Field Activities

TRC will conduct the following activities on-site including: (1) surface and subsurface soil sampling; (2) installation of permanent monitoring wells; and (3) groundwater sampling. Off-site activities will include: (1) surface and subsurface soil sampling; (2) installation of permanent? monitoring wells; (3) surface and groundwater sampling; (4) sediment sampling in the wetlands and bay; and (5) biota sampling.

Table 1. Areas of Concern

Figure 1. Site Map

4.0 SITE HAZARDS

The following site hazards are present or could be encountered at the project area.

4.1 Chemical Hazards

Due to the storage of naphtha, jet fuel, kerosene, diesel, and fuel oil, COPCs at the Site include metals, VOCs, SVOCs, PCBs, and pesticides/herbicides. Specifically, benzene, toluene, ethylbenzene, and xylene (BTEX) is of primary concern for this HASP. Site personnel should avoid touching, breathing or ingesting any media encountered on-site. Nitrile gloves must be worn at all times when in contact with soil, water, and/or hydrocarbons. Section 8 describes in detail procedures that will be followed in ensure a safe breathing zone and protection from vapors of COPCs. Appendix A summarizes the various constituents of concern, the Permissible Exposure Levels (PELs), and the major potential health effects of each. Material Safety Data Sheets (MSDSs) for the COPCs are located in Appendix B.

4.2 Physical Hazards

4.2.1 Heat Stress

Heat stress results when the body is unable to get rid of excess heat. Stages of heat stress are heat cramps, heat exhaustion, and heat stroke. The latter can be fatal. Heat stress is of particular concern when workers must wear chemical protective clothing and ambient air temperatures are high, because protective clothing reduces evaporative body cooling. If ambient air temperatures at the site reach 70°F, heat stress symptoms should be watched for and control measures applied, if they appear.

These symptoms include:

- Heat rash, which may result from continuous exposure to heat or humid air.
- Heat cramps which are caused by heavy sweating and inadequate electrolyte replacement. Signs and symptoms include:
  - Muscle spasms, and
  - Pain in the hands, feet, and abdomen.
- Heat exhaustion, which may occur from increased stress on various body organs, including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

- Pale, cool, moist skin,
- Heavy sweating,
- Dizziness,
- Nausea, and
- Fainting.

- Heat stroke is the most serious form of heat stress in which temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained. Signs and symptoms include:
  - Red, hot, unusually dry skin,
  - Lack of or reduced perspiration,
  - Nausea,
  - Dizziness and confusion,
  - Strong, rapid pulse, and
  - Coma.

A worker who exhibits any of these symptoms will be immediately relieved of responsibilities and told to consume electrolyte fluid or cool water while resting in a shaded area. The individual should not return to work until symptoms are no longer recognizable. If symptoms appear critical, persist, or get worse, the SHSO will seek immediate medical attention for the employee. If the individual does resume work, he/she will be monitored for any increase in heart rate or body temperature for the remainder of their shift. In addition, the worker will be requested to consume electrolyte fluid or cool water every hour.

The SHSO will monitor workers hourly when:

- Symptoms of heat stress are reported or observed;
- Ambient temperatures exceed 70º F and workers are dressed in impervious clothing; or
- Ambient temperatures exceed 90º F and workers are dressed in normal clothing.

Workers will be monitored for heat stress conditions by measuring the heart rate (HR) by radial (wrist) pulse for 30 seconds after one minute of rest. The HR after one minute of rest should not exceed 110 beats per minute. If HR is higher, the next work period shall be shortened by 33%, while the rest period length remains the same. If the pulse rate is still 110 beats per minute after one minute of rest in the next rest period, the following work cycle will be shortened by another 33 percent. This shortening of the work period must continue until the worker's HR is no greater than 110 beats per minute.

4.2.2 Cold Stress

Types of cold stress include general body coldness, hypothermia, and frostbite. The latter two require medical attention. Hypothermia can be fatal while frostbite can result in the amputation of limbs. If ambient air temperatures at the site reach below 39°F, cold stress symptoms should be watched for and control measures applied, if they appear. These symptoms include:

- General body coldness, which is caused by a drop in skin temperature. Signs and symptoms include shivering, numbness in extremities, and loss in manual dexterity and strength.

- Hypothermia is a decrease in deep body temperature (normally 98.6ºF). Signs and symptoms include uncontrollable shivering, slurred speech and memory lapses, irregular breathing, and drowsiness.

- Frostbite occurs when there is inadequate circulation and/or insulation of a body part. Signs and symptoms include skin color change (white or grayish yellow to reddish violet to black), and pain initially, followed by cold and numbness in the affected part.

Preventative measures will help avert serious illness due to cold stress. Appropriate clothing will be worn on the basis of the exterior temperature, wind chill factor, and the level of work. Precautions will be taken to minimize exposed flesh and clothing should be layered as appropriate. A worker who exhibits any symptoms of cold stress will be immediately relieved of responsibilities. If symptoms appear critical, persist, or get worse, the SHSO will seek immediate medical attention for the employee. If the individual does resume work, he/she will be monitored. In addition, the following guidelines will be followed.

Work Below 39ºF (4ºC)

- The employees shall wear cold protective clothing appropriate for the level of cold and physical activity.
- If the air temperature at the site is decreased by wind or artificial ventilation, the cooling effect of the wind will be reduced by shielding the work area or by wearing a removable outer windbreak garment.
- If the clothing on the employee may become wet on the job site, the outer layer of the clothing will be water repellent.
- Workers who become immersed in water or whose clothing becomes wet will immediately be provided with a change of clothing and treated for hypothermia.
- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work shall be modified or suspended until adequate clothing is made available or until weather conditions improve.

TRC does not anticipate cold stress as a factor during these field activities.

4.2.3 Sunburn

Prolonged exposure of the skin to the sun, even on overcast days, can result in sunburn, which can be severe enough to be incapacitating, especially with fair-skinned individuals. Repeated sun burning can eventually cause premature aging of the skin and skin cancer in individuals. Always wear clothing to reduce the amount of exposed skin and frequently use sun block creams or lotions.

4.2.4 Exposure to Excessive Noise

Overexposure to noise can result in hearing loss. If it is difficult to hear normal speech when the speaker is 3 feet from the listener, for more than 4 hours a day, the noise level must be measured. If it exceeds 85 decibels (dBA) as an 8-hour, time-weighted average, hearing protection will be worn in accordance with 29 CFR 1910.95. If a sound level meter is not available, then the noise level will be assumed to be 85 dBA if one cannot communicate at normal voice level within 3 feet from another person. If this is the case, then appropriate hearing protection will be donned.

4.2.5 Heavy Equipment and Motor Vehicle Operation

Only qualified personnel will operate heavy equipment and motor vehicles. Equipment will not be operated in a manner that will endanger persons or property. All heavy equipment and motor vehicles will be operated in accordance with the manufacturer's instructions and 29 CFR 1926 Subpart O.

The following inspection and repair controls will also be implemented during this project:

- Equipment and vehicles will be inspected by the operator on a daily basis, prior to starting work.
- All heavy equipment exhaust systems will be checked daily and confirmed to have no embers or sparking.
- Any unsafe equipment or vehicles will be removed from service until safety defects can be corrected.
- Equipment will be shut down and locked out before maintenance or repairs are made.

Operators will follow these rules:

- Motor vehicles and heavy equipment will be shut down during re-fueling operations.
- Operators will not leave their equipment unattended while it is running.
- Whenever equipment is parked, the parking brake will be set. If the equipment is parked on an incline, in addition to setting the parking brake, the wheels will also be chocked.
- Operators will be trained and experienced in the use of their equipment.
- Vehicles or equipment will not be operated in a careless or unsafe manner.
- Personnel will wear appropriate personal protective equipment (PPE) when working with heavy equipment. Dermal protection must fit properly and be taped to prevent "caught on" or "caught between" hazards.

Required equipment features include:

- All heavy equipment will have an audible backup alarm and an audible warning device (i.e., a horn).
- Each piece of heavy equipment will have a portable fire extinguisher.

When working with moving equipment:

- One designated person will give signals to the operators of both equipment and vehicles in any work area.
- Personnel will stay clear of the operational area of the equipment. Workers are not permitted to stand directly underneath any load or piece of equipment, i.e., man-lift, backhoe bucket, crane load, etc.
- Work areas will be adequately illuminated.

4.2.6 Excavations and Trenches

Compliance with excavation and trenching standards established by OSHA regulation 29 CFR 1926 Subpart P is a requirement of this HASP, as well as the compliance with the requirements presented below.

- Trenches and other large holes must be marked with yellow caution tape at any time the excavation is left unattended. The caution tape must be placed no less than 2 feet from the edge of the excavation
- Personnel will not be allowed to enter an excavation greater than 4 feet deep unless the excavation is properly sloped.
- Excavation spoil shall be placed a minimum of 3 feet from the edge of the excavation.

4.2.7 Slips, Trips, and Falls

Slipping and tripping hazards may be encountered at the site. Footwear appropriate for walking over mud and rocks should be worn. In addition, proper site housekeeping and removal of trash and debris will reduce slipping and tripping hazards. Proper site housekeeping will be the responsibility of all site personnel, and the SHSO will make regular inspections to evaluate if the work area is adequately clean.

4.2.8 Manual Lifting

Back injuries are among the leading occupational injuries reported by industrial workers. Using proper manual lifting techniques can reduce back injuries such as pulls and disc impairments. Leg muscles are stronger than back muscles, so workers should lift with their legs and not with their back.

If the load is too heavy, do not lift it alone. Individual heavy lifting must be avoided. Lifting is always easier when performed with another person. Assistance should always be used when necessary.

4.2.9 Hand and Power Tools

Dangerous hand tools (such as saws, hammers, axes, knives, shovels) and power tools (such as chain saws, power augers, drill motors, chippers, water pumps, and weed trimmers) may be used during some investigation activities.

All hand and power tools will be maintained in a safe condition and in good repair. Hand and power tools will be used in accordance with 29 CFR 1926, Subpart I (1926.300 through 1926.307). Workers are not permitted to bring unsafe tools on-site. All tools will be used, inspected, and maintained in accordance with the manufacturer's instructions. Throwing tools or dropping tools to lower levels is prohibited. Hand and power tools will be inspected, tested, and determined to be in safe operating condition prior to each use. Periodic safety inspections of all tools will be conducted by the tool operator, the Site Manager or the SHSO to evaluate if the tools are in good condition and are being properly maintained. Any tool that fails an inspection will be immediately removed from service and tagged with a "Do Not Use" sign.

Workers using hand and power tools who are exposed to falling, flying, abrasive, or splashing hazards will be required to wear PPE. Eye protection must always be worn when working on-site. Additional eye and face protection, such as safety goggles or face shields, may also be required when working with specific hand and power tools. Workers using tools in areas where there is a head injury hazard will wear hard hats. Hearing protection will always be worn when working with power tools, and additional hearing protection may be required when working with certain power tools if noise levels are excessively high. Workers using tools that may subject their hands to an injury, such as cuts, abrasions, punctures, or burns, will wear protective gloves. Loose or frayed clothing, dangling jewelry, or loose long hair will not be worn when working with power tools.

Electric power-operated tools require ground fault circuit interceptors (GFCI). Electric power-operated tools will be double insulated or grounded, and equipped with an on/off switch. Guards must be provided to protect the operator and other nearby workers from hazards such as in-going nip points, rotating parts, flying chips, and sparks. All reciprocating, rotating, and moving parts of tools will be guarded if contact is possible. Removing machine guards is prohibited.

Circular saws must be equipped with guards that completely enclose the cutting edges and have anti-kickback devices. All planer and joiner blades must be fully guarded. The use of cracked, bent, or otherwise defective parts is prohibited. Chain saws must have an automatic chain brake or kickback device. The worker operating the chain saw will hold it with both hands during cutting operations. A chain saw must never be used to cut above the operator's shoulder height. Chain saws will not be re-fueled while running or hot. Power saws will not be left unattended.

Operators of these tools will be instructed on the proper operation and safety precautions prior to operating such equipment. Only qualified workers will operate pneumatic tools, powder-actuated tools, and abrasive blasting tools. No one shall operate equipment that is in ill repair.

4.2.10 Weather-Related Hazards

Weather-related hazards include the potential for heat, electrical storms, treacherous weather-related working conditions, or limited visibility. These hazards correlate with the season in which Site activities occur. Outside work will be suspended during electrical storms. In the event of other adverse weather conditions, the Field Team Leader will determine if work can continue without endangering the health and safety of on-site personnel.

4.2.11 Drowning Hazards

According to OSHA 29 CFR 1917.126, personnel will be required to wear a personal floatation device (PFD) when conducting work in areas where there is a potential to slip or fall into a body of water. The PFD will be inspected each day prior to use for defects and/or wear and tear. PFD's will be sized appropriately for personnel and used in accordance with the manufacturer's recommendations.

4.3 Biological Hazards

Poisonous snakes, chiggers, mosquitoes, spiders, and bees may be encountered at the Site. This requires that precautious measures be taken when disturbing rocks and other ground features. To greatly reduce insect bites, site personnel should use insect repellent, keep shirts buttoned, sleeves rolled down, and avoid areas with high grass and dense vegetation whenever possible. Snake guards should be used in areas (i.e., rock features, tall grass, etc.) where there is a potential to encounter snakes. Personnel that have allergic reactions to insect stings should inform the SHSO of the condition, carry the appropriate medications with them in the field, and take extra precautions to avoid being stung. Insect repellant should be used when working in vegetated areas.

4.4 Utility Clearance

The location of underground utilities will be identified in the area where soil borings and monitoring wells will be completed. As required by state law, the Texas One Call System, Texas Excavation Safety System, Inc., and/or the Lone Star Notification Center will be contacted. TRC personnel will meet with utility and pipeline representatives prior to commencing subsurface work. Additional utility clearance will consist of reviewing available site maps, visual inspection, corroboration with utility representatives, and probing the sample location with a hand auger or tile probe. Extreme caution must be taken to ensure that no or minimal damage occurs to the Site.

5.0 ACTIVITY-SPECIFIC REQUIREMENTS

5.1 Site Communication

Internal and external communications will be maintained to facilitate quick and smooth response to emergency situations. The following sections describe communication methods.

5.1.1 External Communication

External communication will be accomplished by telephone. The Field Task Leader will keep a cellular phone on-site at all times during investigation field activities.

All personnel must be familiar with the protocol (phone number of emergency organizations, contact person) for contacting public emergency aid teams such as fire departments, ambulance units, and hospitals. These numbers must be posted in the field logbook.

5.1.2 Internal Communication

Internal communication will be used among personnel to alert team members to emergencies, pass along safety information, and maintain site control. Verbal and visual signals will be necessary for internal communication. For effective communication, visual signals/commands must be pre-arranged. Both a primary and backup system are necessary.

5.2 Standard Work Uniform

TRC requires the following work clothing be worn by all on-site personnel:

- Steel-toed boots which have a defined heel, are of the lace-up variety, and are ankle height or taller;
- Safety glasses with permanently attached side shields that meet or exceed American National Standards Institute (ANSI) Z 87.1-1989; and
- Ear plugs when noise levels exceed 85 dBA (i.e., unable to communicate in a normal voice level at arm's length distance from another individual);

5.3 Personal Protective Equipment

In addition to the standard work uniform, the following PPE will be worn within the Exclusion Zone (i.e., area within 25 feet of the work area), as deemed needed.

Level D Protective Uniform

- Steel toed boots;
- Hard hat;
- Hearing protection when noise levels exceed 85 dBA as an 8-hour, time-weighted average;
- Tyvek coveralls when there is a potential to come in contact with impacted material;
- Nitrile gloves when handling soil, water, and/or hydrocarbons.

Level C Protective Uniform

- Half-face (only for airborne levels of 1 to 10 parts per million [ppm]) with organic vapor/dust cartridges (refer to Section 8.2 for respirator use action levels);
- Full-face (only for airborne levels of 10 to 50 ppm) with organic vapor/dust cartridges (refer to Section 8.2 for respirator use action levels);
- Tyvek coveralls when there is a potential to come in contact with impacted material;
- Nitrile gloves when handling soil, water, and/or hydrocarbons.

Field Monitoring and Other Equipment

- Photoionization detector (PID) calibrated with 100 ppm Isobutylene;
- Personal floatation devices;
- Snake guards;
- Wind indicator;
- First aid kit;
- Fire extinguisher.

Conditions Warranting Upgrade from Level D to C (Notify SHSO)

- PID readings greater than 1 ppm above background in breathing zone for more than 1 minute; and
- Unusual odors (i.e., organic or aromatic) are noted.

Conditions Warranting Cessation of Work and Leaving Area Immediately (Notify SHSO)

- PID readings exceed 50 ppm above background in breathing zone for greater than 1 minute;
- The PID malfunctions (work may resume when meter is repaired);
- Odors (organic, aromatic, almond, mothball, sweet tarry, sweet pungent, or mint-like) are experienced while wearing respirators (indicating cartridge breakthrough);
- Any member of field team experiences symptoms possibly related to chemical exposure such as dizziness or nausea; and
- Any member of the field team experiences symptoms related to heat or cold stress.

5.4 Work Zones

Zones are marked by barriers in which specific tasks are to be completed. These zones include the exclusion zone, contamination reduction zone, and support zone.

5.4.1 Exclusion Zone (to be marked by flagging, tape, etc., where feasible)

At a minimum, the Exclusion Zone will include at least a 25-foot radius around the work area.

5.4.2 Contamination Reduction Zone (CRZ)

As applicable, personnel performing equipment decontamination will wear PPE and follow the procedures for decontamination of equipment and personnel outlined in Section 5.5. All personnel and equipment must pass through the CRZ before leaving the site at the end of each workday. The CRZ will be located at the edge of the Exclusion Zone for personnel and small sampling equipment decontamination. All other equipment (i.e., drilling equipment) will be decontaminated at the Site decontamination area.

5.4.3 Support Zone

The Support Zone is intended as an area that remains free of contamination and is used for staging activities, breaks, and eating. It is extremely important to keep this area clean and free of contamination. Never bring contaminated equipment, articles, or yourself into the Support Zone without going through decontamination procedures first.

5.5 Decontamination Procedures

5.5.1 Equipment Decontamination

Drilling equipment and soil/water sampling equipment shall be fully decontaminated at the contamination reduction zones between and before they are removed from the site. Decontamination for drilling equipment will consist of soap and water wash and potable water rinse or using a high-pressure hot water or steam cleaning unit. Additional scrubbing may be required to remove all encrusted materials. Soil/water sampling equipment shall be cleaned between each use by the following procedures (1) removing any solids to the degree possible with a brush and tap water; (2) washing with a brush using laboratory-grade, non-phosphate detergent and tap water, (3) rinsing with tap water, (4) rinsing with 70-percent-grade isopropyl alcohol, and (5) rinsing with distilled water. All equipment decontamination water will be contained and disposed of properly.

5.5.2 Personnel Decontamination

A personnel decontamination area will be designated in the CRZ, which will be located at the edge of each Exclusion Zone. Personnel will become thoroughly familiar with the following decontamination procedures before work begins in an Exclusion Zone:

- Place equipment and/or samples in designated area, move to the next area (marked with signs), if necessary;
- Wash boots (overboots, if used) and outer gloves using soap (Alconox or equivalent) in water solution, and potable water rinse;
- Remove overboots (if used) and outer gloves, and place in plastic bags (in 30-gallon drum);
- Remove disposable coveralls (if used) and place in plastic bag in drum;
- Remove respirator (if used), thoroughly wash and store in a sealed bag outside the CRZ;

- Remove boots and store in appropriate location;
- Remove disposable inner gloves (if used) and place in plastic bag (in 30-gallon drum); and
- Wash hands and face with water and hand soap (especially before eating or drinking).

All personnel decontamination water will be contained and disposed of properly.

It is recommended that after leaving the Site at the end of the workday that personnel shower immediately at their place of lodging.

5.5.3 Storage Procedures for Expendable Clothing/Equipment

Used, expendable clothing and equipment shall be placed in drums labeled as "Waste PPE Material." Proper disposal of the drums will be coordinated with NORCO.

6.0 GENERAL HEALTH AND SAFETY REQUIREMENTS

6.1 Responsibilities of the SHSO

The TRC SHSO is responsible for project safety, decontamination, environmental monitoring, and field medical monitoring activities. The SHSO will ensure that all field personnel comply with the provisions of this HASP. The SHSO has the authority to stop Site work in the event of safety violations or if he/she makes the judgment that an upgraded level of personal protection may be required. **Anyone may stop any operation that threatens the health and safety of personnel.** The SHSO is responsible for designating and marking work zones and for restricting access to Exclusion Zones to properly attired personnel.

The SHSO reports directly to the Project Manager and the HSC. All safety-related questions should be referred to the Project Manager or HSC. The SHSO will keep the CHSO and Project Manager informed of the status of safety-related Site activities and assessments. The SHSO will notify the HSC and Project Manager immediately of any exposure incidents, injuries, accidents, or emergency situations.

6.2 Health and Safety Clearances

TRC personnel authorized to go on-site must meet the following requirements:

- Successfully complete a basic 40-hour health and safety training course and 8 hours of refresher training each year following completion of the basic course;
- At least one field employee must have completed and be current for cardiopulmonary resuscitation (CPR)/First Aid Training; and
- Receive clearances from a TRC-approved physician to wear respiratory protective devices and to work with hazardous materials.

6.3 Distribution of the HASP

A copy of this plan must be provided to each member of the site team covered by the plan and to an authorized representative of each TRC field subcontractor covered by its provisions. Each site team member receiving a copy of the plan must acknowledge receipt of, and express willingness to comply with, the provisions of the plan by signing the attached compliance agreement form. The signed forms must be submitted to the Project Manager or Assistant Project Manager for filing.

6.4 Safety Briefings

All TRC and TRC subcontracted personnel scheduled for fieldwork at the project area will receive an initial health and safety briefing by the SHSO prior to starting work activities. The briefing will include a thorough review of this HASP with particular attention to site-specific health and safety requirements and emergency response procedures. A Job Safety Analysis (JSA) will be completed for the specific tasks and reviewed by personnel prior to performing each task. The blank JSA form is included in Appendix C.

Daily briefings will be conducted by the SHSO on-site to reinforce health and safety awareness and to allow personnel the opportunity for comments or questions. All daily briefings will be documented on the Safety Task Analysis Review (STAR) form included in Appendix D.

6.5 On-Site Presence of Plan

A copy of this HASP must be present at the Site each day that work is in progress.

6.6 Respirators

6.6.1 Usage

The following procedures shall be followed to ensure that air-purifying respirators provide the full protection for which they are rated:

- All employees who are required to wear respirators shall be included in the TRC Medical Monitoring Program and will be medically approved for respirator use before donning a respirator;
- Employees shall wear only respirators for which they have been fit-tested by a competent individual;
- Respirators are to be donned outside the potential hazard zone in which they are planned to be used;
- Prior to donning, the wearer shall inspect the respirator for any physical defects or breakage including, but not limited to:
  - Broken or frayed straps,
  - Improperly seated valves,
  - Dirt,

  - Holes,
  - Distorted face seal, and
  - Opaque face piece on full-facepiece respirators.

- After donning the respirator, the employee shall conduct a negative-pressure fit check to assure that the inlet and exhaust valves, and the respirator cartridges, are properly seated. The employee shall then conduct a positive-pressure fit check to ensure that a proper face piece seal against the face has been obtained. The zone of potentially hazardous exposure is not to be entered until the employee has successfully executed both positive-pressure and negative-pressure fit checks.

- Employees shall immediately evacuate the work area if they experience difficulty breathing, dizziness, or other symptoms of potentially harmful chemical exposure.

- Appropriate respirator cartridges are to be replaced at the beginning of each workday or when breakthrough is detected (whichever comes first).

Note: If at any time during use of a respirator the contaminant of concern, or any other contaminant, is detected by smell, taste or irritation, the employee is to leave the work area immediately and inform the SHSO.

6.6.2 Cleaning

Respirators assigned to an individual employee shall be cleaned by that employee at the end of each day's work involving more than four hours of respirator use and at the end of every week in which the respirator is used for at least two hours. Respirators are to be washed and rinsed in warm water (120 to 140ºF) using a disinfecting solution intended for cleaning respirators, and blot or air-dried. Cleaning solutions, available from respirator manufacturers, will be provided on-site.

6.6.3 Storage

Respirators shall be stored in a manner that protects them from exposure to sunlight, dust, chemicals, and extremes of heat and cold. Respirators shall not be stored in tool kits. The preferred storage procedure for respirators is in individual plastic bags placed in rigid containers to prevent deformation of the face-piece.

7.0 SITE-SPECIFIC HEALTH AND SAFETY REQUIREMENTS

7.1 General Work Rules

- Fieldwork will be conducted only during daylight hours unless adequate lighting is provided.
- Smoking will be permitted only at designated areas at the Site.
- Gloves must be worn for jobs that have the potential for hand injury. The type of glove used depends upon the materials or equipment being handled. Leather or fleece gloves must not be used as a substitute for protective chemical gloves.
- In the event of direct skin contact by chemicals of concern, the affected area will be washed immediately with soap and water.
- In the event the PPE is ripped or torn, work shall stop and the PPE shall be removed and replaced as soon as possible.
- Personnel should never climb over or under refuse or obstacles so as to endanger themselves or others.
- Practice contamination avoidance. Never sit down or kneel, never lay equipment on the ground, avoid obvious sources of contamination such as puddles, and avoid unnecessary contact with on-site objects.
- Water samples to be analyzed for various contaminants may need to be, or already are, preserved with nitric acid, hydrochloric acid, or sulfuric acid before shipment to the analytical laboratory. Nitrile or polyvinyl chloride (PVC) gloves should be worn when handling these corrosive chemicals or samples preserved with them. Sample preservation should be performed in a well-ventilated area to avoid potential accumulation of toxic vapors. In circumstances where bad weather or poor lighting does not allow preservation at the site, preservation should be performed at a later time, or not at all. Samples should not be preserved in hotel rooms or other public areas.
- Good housekeeping is the responsibility of every employee. All work areas are to be kept as clean and orderly as possible. It is the responsibility of the persons performing the work to ensure that the work site is kept clean.

- No eating, drinking, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material will be allowed in the Exclusion Zone or Contamination Reduction Zone.

- Hard contact lenses should not be worn in the Exclusion Zone or Contamination Reduction Zone. No jewelry that interferes with protective clothing fit will be worn.

- No beards, sideburns, or mustaches will be allowed that interfere with respirator mask seals, if respirators are used. The SHSO will determine if facial hair presents such an interference.

- Field personnel should remain aware of wind direction throughout the day. Wind socks or flagging will be used for this purpose. Equipment setup and sampling efforts should be directed to the greatest extent possible so that workers remain upwind of potential sources of exposure.

- No drilling or earth moving activities will be permitted during periods of thunderstorms and lightning.

- Machinery, tools, material, electrical installation, and other equipment and work practices that are judged unsafe, or not in compliance with this HASP, OSHA, or other applicable standards, shall be removed or replaced or the work practice corrected. Only employees qualified by training and/or experience will operate equipment and machinery.

- Before excavating or sampling, an Exclusion Zone must be established around the equipment after it has been positioned. The boundary of the Exclusion Zone shall extend at least 25 feet from the work area and, if practical, marked with stakes spaced no more than 20 feet apart and connected with fluorescent orange tape. Only authorized personnel will be allowed to enter Exclusion Zones.

- Representatives of federal, state, and local agencies; newspaper and other news media; the public; and all other individuals who are not a part of the TRC site team are classified as visitors and will not be permitted to enter Exclusion Zones under control by TRC, unless they can prove that they have met OSHA medical and training requirements for hazardous waste operation, have available to them PPE equivalent to that specified in this plan, and obtain permission from the TRC site or project manager.

7.2 Documentation

The following must be kept on file by the SHSO:

- Copies of the TRC Employee Health and Safety Compliance Agreement (attached) documenting health and safety briefings and personnel signatures;
- Records of usage and calibration of environmental monitoring equipment;
- Documentation of employee injury/exposure incidents;
- Records of safety violation and remedial actions taken;
- Documentation of subcontractors' compliance with TRC for health and safety training and medical monitoring.

A health and safety field logbook will be maintained on-site and should contain such information as weather conditions, employees and visitors on-site, level of personal protection, monitoring instrument readings (average, peak, and background), subjects discussed during site health and safety briefings, and names of attendees. All field personnel, including subcontractors, must sign the TRC Employee Health and Safety Compliance Agreement indicating that they have attended a briefing by the SHSO, and that they understand and agree to abide by the provisions of this HASP, in addition to the provisions of their own health and safety plan prior to working at the project area.

7.3 Site Specific Requirements

7.3.1 Housekeeping

Good housekeeping is of the utmost importance in the prevention of accidents, injuries, and fires. Clean-up will be conducted on a daily basis.

7.3.2 Spills

No contaminants (i.e., oils, diesel fuel, gasoline, etc.) are to be discharged at the project area. Should a release occur, it must be reported by the quickest means possible to the NORCO representative. Decontamination water is considered to be contaminated and should not be released onto the ground. All decontamination water spills should be reported to the TRC Field Team Leader for determination of appropriate action.

7.3.3 Operation of Vehicles and Equipment

Equipment and vehicles must operate at a safe speed while being aware of operating conditions and other equipment and personnel working in close proximity. Extreme caution must be exercised at all grade crossings.

8.0 MONITORING

TRC anticipates the potential for a risk of COPC vapor inhalation exposure; therefore, ambient air monitoring will be conducted as part of this Health and Safety Plan. Additionally, pH monitoring will be conducted during investigation activities in AOC 1N and AOC-1S?.

8.1 Monitoring Instruments

A PID with a 10.6 electron volt lamp, calibrated with 100 ppm isobutylene, will be used to monitor breathing zone organic vapors. Calibration of the PID will be documented on the *Field Equipment Calibration/Maintenance Log* form including in Appendix E. The PID will read total hydrocarbon vapor levels. The action levels discussed below have been calculated taking into account known COPCs present at the Site and respective PELs.

At this time, TRC does not anticipate the potential for hydrogen sulfide (H_2S) gas inhalation exposure; therefore, continuous air monitoring for H_2S will not be conducted.

8.2 Action Levels

Respirators must be donned by all persons working in any Exclusion Zone in which the average PID reading is 1 ppm above background in the breathing zone (for greater than 1 minute). Half-face respirators will be worn from 1 to 10 ppm and full-face respirators will be worn from 10 to 50 ppm. The Exclusion Zone must be evacuated whenever the average PID reading equals or exceeds 50 ppm above background in the breathing zone for greater than 1 minute. PID action levels are listed in the table below. Air monitoring results will be documented on the *Air Quality Monitoring Record* form located in Appendix E.

If evacuation becomes necessary, the SHSO shall take charge and direct personnel to move from the Exclusion Zone to a predetermined area and to stay there. The SHSO shall first determine that all personnel have left the Exclusion Zone and are safe, then consult the HSC on how to proceed.

Action Levels for Air Monitoring

Equipment Type		Monitoring, Action Levels, and PPE
ORGANIC VAPORS		
☒ PID ☐ FID ☒ Detector Tube Type: benzene		Reading > 1 ppm or "Background" sustained for 1 minute, upgrade to Level C with half-face APR, Notify TRC SHSO. Reading > 10 ppm sustained for 1 minute, upgrade respiratory protection to full-face APR, Notify TRC SHSO. Reading > 50 ppm sustained for 1 minute, shutdown work activities, evacuate the area, move upwind, Notify the TRC SHSO.

8.3 pH Monitoring

Monitoring of groundwater and wastewater will be required at least daily during excavation activities to evaluate pH levels. Monitoring will also be performed in the event additional or new flows and/or sources of groundwater or wastewater are identified. Monitoring will be performed using either pH paper or a pH meter (in the field or a sample taken to the Laboratory). If a pH meter is utilized, the meter must be calibrated daily and the calibration results documented in the project field notes.

Monitoring will be performed in general accordance with the following procedures:

1. If pH paper is used, the paper will be placed so it comes in contact with the liquid for evaluation. The paper will be allowed to change colors. The color of the paper will be compared to the pH color chart included with the pH to determine the approximate pH. The pH value will be recorded in the project field notes.

2. If a pH meter is used, the pH probe will be placed in the liquid to be evaluated. The results will be read from the pH meter and recorded in the project field notes.

<u>If pH is less than 5 or greater than 9, then proper actions must be taken for conditions that are considered "acidic" or "caustic."</u>

9.0 EMERGENCY PROCEDURES

Emergency procedures listed in this HASP are designed to give the field team instructions in handling medical emergencies, fire, and explosions.

9.1 Medical Injuries

Medical problems that can occur on-site need to be handled competently and quickly. Each field team member should be aware of the instructions and information given below:

- Seek professional medical attention for personnel that are bleeding severely, experiencing intense pain, unconscious, or not breathing. Each member of the site team should know how to call for an ambulance.
- If you get anything in your eyes (chemical or dust), flood them with water for 15 minutes. Be sure to tell the SHSO. The SHSO will make sure that the victim washes the eyes for the full 15 minutes.
- Do not remove objects that are impaled (stuck) in the eye.
- Always seek medical attention for eye injuries.
- Stop bleeding with direct pressure. Place bandage over the wound and press down with your hand. If possible, raise the bleeding extremity above the level of the heart. Use a tourniquet ONLY in extreme cases when you are not able to stop severe bleeding.
- If you contact the waste, wash the affected area with soap and water immediately.

9.2 Fire and Explosion Response Procedures

Fires can be caused by the drilling rig activity. The TRC field team should verify that the drilling rig has a fire extinguisher on hand at all times. The procedures for using a fire extinguisher is to **pull** the safety pin, **aim** the extinguisher at the base of the flames and discharge the extinguisher by **squeezing** and **sweeping** the flames from a distance of 6 feet (PASS-pull, aim, squeeze, sweep). Move in closer as the flames are put out.

- Never use water on an electrical fire or a solvent fire. All extinguishers should be dry chemical labeled “Class A, B, or C”; and
- Keep decontamination solvents well away from the steam cleaner.

9.3 Emergency Medical Information

TRC Site Health & Safety Officer (SHSO):

Alonzo Arredondo (512) 699-9931

TRC Corporate Health and Safety Director:

Ron Severson (860) 298-6256 or (860) 906-4656

TRC Health and Safety Coordinator:

Matt Webre (512) 684-3140 or (512) 567-7936

TRC Safety Contact (Austin):

Matt Webre (512) 684-3140 or (512) 567-7936

Project Managers (Austin):

Stephen Halasz (512) 684-3351 or (512) 745-6155

9.3.1 First Aid

First aid at the Site will consist of a first aid kit, which will be brought to the Site daily by the SHSO and be kept at the edge of the Exclusion Zone during field activities.

9.3.2 Hospitals

Personnel with any injuries shall be taken to Care Regional Medical Center located approximately 5 miles northeast of the project area. A map and driving directions from Falcon Refinery to Care Regional Medical Center are provided in Appendix F.

9.4 Incident Investigation

It is important that all accidents and incidents that result in injury, illness, or medical treatment be reported immediately. Reporting consists of calling the Teleclaim Center and providing information on the injury. The Teleclaim Center will complete the first report of injury and file it accordingly. Copies will be sent to the Safety Director. Supervisors are required to complete the Supervisor's Report of Accident included in this section. It is TRC's responsibility to investigate each incident, file appropriate paperwork and conduct a follow-up analysis of each incident.

Reporting Phone Numbers

TRC Corporate Health and Safety Director: (860) 298-6256

Hartford Insurance Teleclaim:	1-800-327-3636
Human Resources Director:	1-800-365-8254

Any work related injury or illnesses that requires professional medical assistance should be reported immediately. Failure to promptly notify of a work related injury could make the claim questionable and subject to stricter review.

After medical attention has been administered, an incident investigation will be completed. The TRC Project Manager will also complete the *TRC Incident Report Form* located in Appendix G.

9.4.1 Emergency Numbers

Service	**Address**	**Phone**
Fire Department:	Ingleside Fire Department 2425 Eighth Street Ingleside, TX 78362	**911** (361) 776-7422
Police Department:	Ingleside Police Department 2425 Eighth Street Ingleside, TX 78362	**911** (361) 776-2531
Hospital:	Care Regional Medical Center 1711 West Wheeler Avenue Aransas Pass, TX 78336	**911** (361) 758-8585
Nearest phone: Cellular phone	Alonzo Arredondo Field Task Leader/SHSO	(512) 699-9931

Emergency Services are accessed through 911

10.0 SITE PERSONNEL ACKNOWLEDGE OF HASP

The following TRC site personnel have read, understand, and agree to comply with all of the health and safety directives for the Falcon Refinery Superfund Site.

Crew	Date
_____	_____
_____	_____
._____	_____
_____	_____
_____	_____
_____	_____
_____	_____

In addition, the following contractor personnel have been briefed on the site hazards, have reviewed their own HASP (per 29 CFR 1910.120(i)(2), have completed the required 40-hour OSHA Training (per 29 CFR 1926.21 and 1910.120(e), have been properly respirator fit tested, and are involved in their company's Medical Surveillance Program (per 29 CFR 1910.120(f)). They hereby acknowledge having met all the above stated requirements for working at the Falcon Refinery Superfund Site.

Contractor Personnel	**Company**	**Date**

APPENDIX A

Potential Chemical Hazards

CHEMICAL HAZARD DATA								
			TWA					
Chemical Name	Carcinogen (Y/N)	Skin Absorption Hazard (Y/N)	OSHA PEL	NIOSH REL	ACGIH TLV	OSHA STEL	IDLH	Routes of Exposure
Benzene	Y	Y	1.0 ppm	0.1 ppm	0.5 ppm	5 ppm	500 ppm	I,S,G,C
Toluene	N	Y	200 ppm	100 ppm	50 ppm	300 ppm	500 ppm	I,S,G,C
Xylene(s)	N	Y	100 ppm	150 ppm	100 ppm	N/A	900 ppm	I,S,G,C
Ethylbenzene	N	N	100 ppm	100 ppm	100 ppm	N/A	800 ppm	I,G,C

TWA = Time-Weighted Average
PEL = Permissible Exposure Limit
REL = Recommended Exposure Limit identifying NIOSH
TLV = Threshold Limit Value identifying ACGIH
STEL = Short Term Exposure Limit
IDLH = Immediate Dangerous to Life or Health
Routes of Exposure: I = inhalation, S = skin absorption, G = ingestion, C = skin contact
ppm = parts per million
mg/m^3 = milligrams per cubic meter (of air)

APPENDIX B

Material Safety Data Sheets

MSDS SUMMARY SHEET

Manufacturer:
Name: PHILLIPS PETROLEUM COMPANY
Address 1:
Address 2:
Address 3:
CSZ: BARTLESVILLE **State:** OK **Zipcode:** 74004
Emergency phone: (800) 424-9300
Business phone: 800-762-0942

Product:

Ferndale MSDS#: 1354 **Version # :** 6
Manufacturer MSDS#: 0041
Current? : 2002
Name:

NO. 2 DIESEL FUEL

Synonyms:

CARB **Diesel** TF3
CARB **Diesel**
CARB **Diesel** 10%
Diesel Fuel Oil
EPA Low Sulfur **Diesel** Fuel
EPA Low Sulfur **Diesel** Fuel – Dyed
EPA Off Road High Sulfur **Diesel –** Dyed
Fuel Oil No. 2 – CAS # 68476-30-2
No. 2 **Diesel** Fuel Oil
No. 2 Fuel Oil – Non Hiway – Dyed
No. 2 High Sulfur **Diesel** – Dyed
No. 2 Low Sulfur **Diesel** - Dyed
No. 2 Low Sulfur **Diesel** - Undyed
Crude column 3rd IR
Crude column 3rd side cut
Atmospheric tower 3rd side cut
Ultra Low Sulfur **Diesel** No. 2
Finished **Diesel**
DHT Reactor Feed
Straight Run **Diesel**
Diesel
Middle Distillate

Product/Catalog Numbers:
MSDS Date: 01/01/2002 **(received:** 01/14/2002**)**

NFPA codes:
Health: 0 **Flammability:** 2 **Reactivity:** 0

MATERIAL SAFETY DATA SHEET
No. 2 Diesel Fuel

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: No. 2 Diesel Fuel
Product Code: Multiple
SAP Code:
Synonyms: 1354
CARB Diesel TF3
CARB Diesel
CARB Diesel 10%
Diesel Fuel Oil
EPA Low Sulfur Diesel Fuel
EPA Low Sulfur Diesel Fuel – Dyed
EPA Off Road High Sulfur Diesel – Dyed
Fuel Oil No. 2 – CAS # 68476-30-2
No. 2 Diesel Fuel Oil
No. 2 Fuel Oil – Non Hiway – Dyed
No. 2 High Sulfur Diesel – Dyed
No. 2 Low Sulfur Diesel - Dyed
No. 2 Low Sulfur Diesel – Undyed
No. 2 Ultra Low Sulfur Diesel – Dyed
No. 2 Ultra Low Sulfur Diesel - Undyed
Intended Use: Fuel
Chemical Family:
Responsible Party: Phillip's Petroleum Company
Bartlesville, Oklahoma 74004
For Additional MSDSs: 800-762-0942
Technical Information:

The intended use of this product is indicated above. If any additional use is known, please contact us at the Technical Information number listed.

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:
Spill, Leak, Fire or Accident
Call CHEMTREC
North America: (800) 424-9300
Others: (703) 527-3887 (collect)

California Poison Control System: 800-356-3120

Health Hazards/Precautionary Measures: Causes severe skin irritation. Aspiration hazard if swallowed. Can enter lungs and cause damage. Use with adequate ventilation. Avoid contact with eyes, skin and clothing. Do not taste or swallow. Wash thoroughly after handling.

Physical Hazards/Precautionary Measures: Flammable liquid and vapor. Keep away from heat, sparks, flames, static electricity or other sources of ignition.

Appearance: Straw-colored to dyed red
Physical Form: Liquid
Odor: Characteristic petroleum

HFPA Hazard Class:
Health: 0 (Least)
Flammability: 2 (Moderate)
Reactivity: 0 (Least)

HMIS Hazard Class
Not Evaluated

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% VOLUME	Limits	EXPOSURE GUIDELINE Agency	Type
Diesel Fuel No. 2 CAS# 68476-34-6	100	100* mg/m3	ACGIH	TWA-SKIN
Naphthalene CAS# 91-20-3	<1	10ppm	ACGIH	TWA
		15ppm	ACGIH	STEL
		10ppm	OSHA	TWA
		250ppm	NIOSH	IDLH

All components are listed on the TSCA inventory

Tosco Low Sulfur No. 2 Diesel meets the specifications of 40 CFR 60.41 for low sulfur diesel fuel.

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

*Proposed ACGIH (1999)

3. HAZARDS IDENTIFICATION

Potential Health Effects:

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Severe skin irritant. Contact may cause redness, itching, burning, and severe skin damage. Prolonged or repeated contact can worsen irritation by causing drying and cracking of the skin, leading to dermatitis (inflammation). Not actually toxic by skin absorption, but prolonged or repeated skin contact may be harmful (see Section 11).

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): Low degree of toxicity by ingestion. ASPIRATION HAZARD – This material can enter lungs during swallowing or vomiting and cause lung inflammation and damage.

Signs and Symptoms: Effects of overexposure may include irritation of the nose and throat, irritation of the digestive tract, nausea, diarrhea and transient excitation followed by signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Cancer: Possible skin cancer hazard (see Sections 11 and 14).

Target Organs: There is limited evidence from animal studies that overexposure may cause injury to the kidney (see Section 11).

Developmental: Inadequate data available for this material.

Pre-Existing Medical Conditions: Conditions aggravated by exposure may include skin disorders and kidney disorders.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Immediately remove contaminated shoes, clothing, and constrictive jewelry and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek immediate medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops, seek immediate medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard; Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

5. FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: >125°F/>52°
OSHA Flammability Class: Combustible liquid
LEL %: 0.3 / UEL %: 10.0
Autoignition Temperature: 500°F/260°C

Unusual Fire & Explosion Hazards: This material is flammable and can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk.

Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended.

Stay upwind and away from spill/release. Notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8).

Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Dike far ahead of spill for later recovery or disposal. Use foam on spills to minimize vapors (see Section 5). Spilled material may be absorbed into an appropriate material.

Notify fire authorities and appropriate federal, state, and local agencies. Immediate cleanup of any spill is recommended. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, notify the National Response Center (phone number 800-424-8802).

7. HANDLING AND STORAGE

Handling: Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharged. The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-704 and/or API RP 2003 for specific bonding/grounding requirements.

Do not enter confined spaces such as tanks or pits without following proper entry procedures such ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Sections 2 and 8).

Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames. Use good personal hygiene practices.

High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection apparatus or from pinhole leaks in tubing or high pressure hydraulic oil equipment.

“Empty” containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. “Empty” drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSIZ49.1 and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area “No Smoking or Open Flame.” Store only in approved containers. Keep away from incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentration below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: A NIOSH certified air purifying respirator with an organic vapor cartridge maybe used under conditions where airborne concentrations are expected to exceed exposure limits (see Section 2).

Protection provided by air purifying respirators is limited (see manufacturer's respirator selection guide). Use a positive pressure air supplied respirator if there is a potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrants a respirator's use.

Skin: The use of gloves impervious to the specific material handled is advised to prevent skin contact, possible irritation and skin damage (see glove manufacturer literature for information on permeability). Depending on conditions of use, apron and/or arm covers may be necessary.

Eyes/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse. It is recommended that impervious clothing be worn when skin contact is possible.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1atm).

Appearance: Straw-colored to dyed red
Physical State: Liquid
Odor: Characteristic petroleum
pH: unavailable
Vapor Pressure (mm Hg): 0.40
Vapor Densisty (air=1):>3
Boiling Point/Range: 320-700°F /160-371°C
Freezing/Melting Point: No Data
Solubility in Water: Negligible
Specific Gravity: 0.81-0.88 @ 60°F
Percent Volatile: Negligible
Evaporation Rate (nBuAc=1): <1
Viscosity: 32.6-40.0 SUS @ 100°F
Bulk Density: 7.08 lbs/gal
Flash Point: >125°F / >52°C
Flammable/Expolsive Limits (%): LEL: 0.3 / UEL: 10.0

10. STABILITY AND REACTIVITY

Stability: Stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Flammable liquid and vapor. Vapor can cause flash fire.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 and 7).

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite, calcium hypochlorite, etc.

Hazardous Decomposition Products: The use of hydrocarbon fuels in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels. ACGIH has included a TLV of 0.05 mg/m3 TWA for diesel exhaust particulate on its 1999 Notice of Intended Changes. See Section 11 for additional information on hazards of engine exhaust.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Diesel Fuel No. 2 (CAS# 68476-34-6)

Carcinogenicity: Chronic dermal application of certain middle distillate streams contained in diesel fuel No. 2 resulted in an increased incidence of skin tumors in mice. This material has not been identified as carcinogen by NTP, IARC, or OSHA. Diesel exhaust is a probable cancer hazard based on tests with laboratory animals.

Target Organ(s): Limited evidence of renal impairment has been noted from a few case reports involving excessive exposure to diesel fuel No. 2.

Naphthalene (CAS# 91-20-3)

Carcinogenicity: Naphthalene has been evaluated in two year inhalation studies in both rats and mice. The National Toxicology Program (NTP) concluded that there is clear evidence of carcinogenicity in male and female rats based on increased incidences of respiratory epithelial adenomas and olfactory epithelial neuroblastomas of the nose. NTP found some evidence of carcinogenicity in female mice (alveolar adenomas) and no evidence of carcinogenicity in male mice. Naphthalene has not been identified as a carcinogen by IARC or OSHA.

12. ECOLOGICAL INFORMATION

Not evaluated at this time.

13. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic(s) of ignitability (D001) and benzene (D018). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent then the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container ?insate? could be considered a RCRA hazardous waste and must be disposed of with care and in compliance with federal, state and local regulations. Large empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller containers, consult with state and local regulations and disposal authorities.

14. TRANSPORT INFORMATION

DOT Shipping Description: Diesel Fuel, NA1983
Non-Bulk Package Marking: Diesel Fuel, 3, NA 1993, III

15. REGULATORY INFORMATION

EPA SARA 311/312 (Title III Hazard Categories):

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactive Hazard:	No

SARA 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372:

Component	CAS Number	Weight %
-- None known --		

California Proposition 65:

Warning: This material contains the following chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Effect
Benzene	Cancer, Developmental and Reproductive Toxicant
Toluene	Developmental Toxicant

Diesel engine exhaust, while not a component of this material, is on the Proposition 65 list of chemicals known to the State of California to cause cancer.

Carcinogen Identification:

This material has not been identified as a carcinogen by NTP, IARC, or OSHA. See Section 11 for carcinogenicity information of individual components, if any. Diesel exhaust is a probable cancer hazard based on tests in laboratory animals. It has been identified as carcinogen by IARC.

EPA (CERCLA Reportable Quantity: None

16. OTHER INFORMATION

Issue Date: 01/01/02
Previous Issue Date: 05/15/01
Product Code: Multiple
Revised Sections: None
Previous Product Code: Multiple
MSDS Number: 0041

Disclaimer of Expressed and Implied Warranties:

The information presented in this Material Data Safety Sheet is based on data believed to be accurate as of the date this Material Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THE PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Tosco Refining Company ***Ferndale Refinery***

UltraLow Sulfur Diesel Product Specification

Ferndale Product Code:34380xx (5) Product Code: ULSD2

(COMETS)

Specification	Unit	Limit	Test Procedure	Typical
Appearance				
Water & Sediment	Vol %	0.05 Max	D 2709	
Color	Number	3.0 Max	D 1500	
Haze Rating	Rating	2 Max	D 4176	
Composition				
Carbon Residue (Ramsbottom)	Wt %	0.35 Max	D 524, D 189	
Volatility				
90% Recovered	Deg; F	540 Min	D 86	
	Deg; F	640 Min	D 86	
Flash Point	Deg; F	125 Min (1)	D 93	130 F
Gravity	API	30 Min	D 287, D4052	
Fluidity				
Pour Point	Deg; F	See Season Table (6)	D 97	
Cloud Point	Deg; F	See Season Table (6)	D 2500	10 F
Viscosity @ 104F	cSt	1.9 Min	D 445	
	cSt	4.1 Max	D 445	
Lubricity, SLBOCLE	grams	3100 Min	D 6078	3300gm
Lubricity, HFRR	mm	.45	D 6079	
Combustion				
Cetane Index or Cetane Number (3,4)	Number	40.0 Min	D 976, D613	47.0
Corrosion				
Copper Strip, 3hr @ 50 deg C	Number	3 Max (2)	D 130	
Aromatics (4)	Vol %	35 Max	D 1319	25 %
Contaminants				
Total Sulfur	PPM	30 Max	D 2622, D4294	15-20ppm
Water & Sediment	Vol %	0.05 Max	D 1796	
Ash	Wt %	0.01 Max	D 482	
Additives				
Cetane Improver	Lb/MBbl	675 Max		
Dye		Undyed		

1. Minimum release specification is 125 deg. F. The refinery should target 135 deg. F.
2. Test result reported as a number and letter (e.g. 1a). Any letter is allowable as long as the number meets the spec shown.
3. Either specification must be met.
4. Either cetane index minimum or aromatics maximum must be met.
5. Winter cloud and pour specifications may be relaxed to the summer specifications by agreement with the customer.
6. Season Table

Month	Product Code	Pour Point	Cloud Point
Jan, Feb, Nov, Dec	WI	0 max (5)	14 max (5)
Mar - Oct	SU	15 max	24 max

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
959 ROUTE 46 EAST
PARSIPPANY, NEW JERSEY 07054-0624

EMERGENCY CONTACT:
CHEMTREC 1-800-424-9300
INFORMATION CONTACT:
973-257-1100

SUBSTANCE: ETHYL BENZENE

TRADE NAMES/SYNONYMS:
MTG MSDS 185; BENZENE, ETHYL-; EB; PHENYLETHANE; ETHYLBENZENE; ETHYLBENZOL; ALPHA-METHYLTOLUENE; UN 1175; C8H10; MAT08780

CHEMICAL FAMILY: hydrocarbons, aromatic

CREATION DATE: Jan 24 1989
REVISION DATE: Jun 17 2004

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: ETHYL BENZENE
CAS NUMBER: 100-41-4
PERCENTAGE: 100

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=3 REACTIVITY=0

EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: aromatic odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, aspiration hazard, central nervous system depression, suspect cancer hazard (in animals)
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire.

POTENTIAL HEALTH EFFECTS:
INHALATION:
SHORT TERM EXPOSURE: irritation (possibly severe), chest pain, difficulty breathing, headache,

drowsiness, dizziness, loss of coordination, coma
LONG TERM EXPOSURE: irritation, headache, drowsiness, emotional disturbances, cancer
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation (possibly severe)
LONG TERM EXPOSURE: irritation
EYE CONTACT:
SHORT TERM EXPOSURE: irritation (possibly severe)
LONG TERM EXPOSURE: irritation
INGESTION:
SHORT TERM EXPOSURE: nausea, vomiting, stomach pain, aspiration hazard
LONG TERM EXPOSURE: no information on significant adverse effects

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Thoroughly clean and dry contaminated clothing and shoes before reuse. Destroy contaminated shoes.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: Contact local poison control center or physician immediately. Never make an unconscious person vomit or drink fluids. When vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. For ingestion, consider gastric lavage and activated charcoal slurry.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.

EXTINGUISHING MEDIA: regular dry chemical, carbon dioxide, water, regular foam

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool

containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Water may be ineffective.

FLASH POINT: 59 F (15 C) (CC)
LOWER FLAMMABLE LIMIT: 0.8%
UPPER FLAMMABLE LIMIT: 6.7%
AUTOIGNITION: 810 F (432 C)
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

AIR RELEASE:
Reduce vapors with water spray. Stay upwind and keep out of low areas.

SOIL RELEASE:
Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:
Cover with absorbent sheets, spill-control pads or pillows. Neutralize. Collect with absorbent into suitable container. Absorb with activated carbon. Remove trapped material with suction hoses. Collect spilled material using mechanical equipment. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store with flammable liquids. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
ETHYL BENZENE:
100 ppm (435 mg/m3) OSHA TWA
125 ppm (543 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993)
100 ppm ACGIH TWA
125 ppm ACGIH STEL
100 ppm (435 mg/m3) NIOSH recommended TWA 10 hour(s)
125 ppm (545 mg/m3) NIOSH recommended STEL

VENTILATION: Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
800 ppm
Any chemical cartridge respirator with organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any powered, air-purifying respirator with organic vapor cartridge(s).
Any supplied-air respirator.
Any self-contained breathing apparatus with a full facepiece.
Escape -
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: aromatic odor
MOLECULAR WEIGHT: 106.17
MOLECULAR FORMULA: C-H3-C-H2-C6-H5

BOILING POINT: 277 F (136 C)
FREEZING POINT: -139 F (-95 C)
VAPOR PRESSURE: 7.1 mmHg @ 20 C
VAPOR DENSITY (air=1): 3.66
SPECIFIC GRAVITY (water=1): 0.8670
WATER SOLUBILITY: 0.015%
PH: Not available
VOLATILITY: 100%
ODOR THRESHOLD: 140 ppm
EVAPORATION RATE: <1 (butyl acetate=1)
VISCOSITY: 0.64 cP @ 25 C
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available
SOLVENT SOLUBILITY:
Soluble: alcohol, ether, benzene, sulfur dioxide, carbon tetrachloride
Insoluble: ammonia

10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.

INCOMPATIBILITIES: acids, bases, oxidizing materials, combustible materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

ETHYL BENZENE:
IRRITATION DATA:
15 mg/24 hour(s) open skin-rabbit mild; 500 mg eyes-rabbit severe
TOXICITY DATA:
55000 mg/m3/2 hour(s) inhalation-rat LC50; 17800 ul/kg skin-rabbit LD50; 3500 mg/kg oral-rat LD50
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Sufficient Evidence, Group 2B; ACGIH: A3 -Animal Carcinogen
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Moderately Toxic: ingestion
Slightly Toxic: inhalation, dermal absorption

TARGET ORGANS: central nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies
TUMORIGENIC DATA: Available.
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.
ADDITIONAL DATA: May cross the placenta.

12. ECOLOGICAL INFORMATION

FATE AND TRANSPORT:
KOW: 154170.05 (log = 5.196) (estimated from water solubility)

KOC: 44668.36 (log = 4.657) (estimated from water solubility)

HENRY'S LAW CONSTANT: 6.6 E -3 atm-m3/mol

BIOCONCENTRATION: 36.39 (estimated from water solubility)

AQUATIC PROCESSES: 2.6730095 hours (River Model: 1 m deep, 1 m/s flow, 3 m/s wind)

ENVIRONMENTAL SUMMARY: Relatively non-persistent in the environment. Not expected to leach through the soil or the sediment. Accumulates very little in the bodies of living organisms. Highly volatile from water.

13. DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Ethylbenzene
ID NUMBER: UN1175
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Ethylbenzene
UN NUMBER: UN1175

CLASS: 3
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
ETHYL BENZENE: 1000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: No
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
ETHYL BENZENE

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65:
Known to the state of California to cause the following:
ETHYL BENZENE
Cancer (Jun 11, 2004)

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: B2.

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MATHESON TRI-GAS, INC. MAKES NO EXPRESS OR IMPLIED WARRANTIES, GUARANTEES OR REPRESENTATIONS REGARDING THE PRODUCT OR THE INFORMATION HEREIN, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR USE. MATHESON TRI-GAS, INC. SHALL NOT BE LIABLE FOR ANY PERSONAL INJURY, PROPERTY OR OTHER DAMAGES OF ANY NATURE, WHETHER COMPENSATORY, CONSEQUENTIAL, EXEMPLARY, OR OTHERWISE, RESULTING FROM ANY PUBLICATION, USE OR RELIANCE UPON THE INFORMATION HEREIN.

Material Safety Data Sheet

MSDS ID NO.: 0274MAR019
Revision date: 07/25/2006

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon Residual Fuel Oil
Synonym: Bunker C Fuel; Fuel Oil Residual; Slurry Blendstock; No. 6 Fuel Oil; No. 6 Residual Fuel Oil; Residual Fuel Oil
Chemical Family: Petroleum Hydrocarbon
Formula: Mixture

Manufacturer:
Marathon Petroleum Company LLC
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION / INFORMATION ON INGREDIENTS

Heavy or Residual Fuel Oil is a complex mixture of high molecular weight hydrocarbons produced from high temperature treatment of heavy petroleum fractions.

This product was analyzed by MPC and found to contain 0.05-0.6% of the 22 3-7 ring polycyclic aromatic compounds identified as Persistent Bioaccumulative Toxic (PBT) Chemicals subject to reporting under EPA EPCRA Section 313 regulations.

Product information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Marathon Residual Fuel Oil	68476-33-5	100			

Component Information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Petroleum Residua	Mixture	0-100			
Catalytic Cracked Clarified Oil	64741-62-4	0-90			
Diesel Oil	68334-30-5	0-30	= 100 mg/m³ TWA vapor and aerosol, as total hydrocarbons skin - potential for cutaneous absorption (as total hydrocarbons)		
Sulfur Compounds	Mixture	0.5-4			
5-methylchrysene	3697-24-3	0.01-0.2			
Naphthalene	91-20-3	0.01-0.15	Skin - potential significant contribution to overall exposure by the cutaneous route = 10 ppm TWA = 15 ppm STEL	= 10 ppm TWA = 50 mg/m³ TWA = 15 ppm STEL = 75 mg/m³ STEL	
Benzo(a)phenanthrene	218-01-9	0.01-0.1	= 0.2 mg/m³ TWA as benzene soluble aerosol	= 0.2 mg/m³ TWA benzene soluble fraction	
Hydrogen Sulfide	7783-06-4	0-0.01	= 10 ppm TWA = 15 ppm STEL	= 10 ppm TWA = 14 mg/m³ TWA = 15 ppm STEL = 21 mg/m³ STEL	

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

THIS PRODUCT IS A BROWN TO BLACK VISCOUS COLORED LIQUID. THIS PRODUCT IS CONSIDERED TO BE A COMBUSTIBLE LIQUID PER THE OSHA HAZARD COMMUNICATION STANDARD AND SHOULD BE KEPT AWAY FROM HEAT, FLAME AND SOURCES OF IGNITION. LONG-TERM SKIN EXPOSURE TO COMPONENTS OF THIS PRODUCT HAS CAUSED CANCER IN LABORATORY ANIMALS AND HUMANS. REPEATED SKIN CONTACT TO SOME COMPONENTS OF THIS PRODUCT HAVE PRODUCED SYSTEMIC TOXICITY (INCLUDING LIVER DAMAGE) IN LABORATORY ANIMALS. WHEN HEATED THIS MATERIAL MAY VENT TOXIC LEVELS OF HYDROGEN SULFIDE (H2S) VAPORS THAT ACCUMULATE IN THE VAPOR SPACES OF STORAGE AND TRANSPORT COMPARTMENTS. H2S VAPORS CAN CAUSE EYE, SKIN, AND RESPIRATORY TRACT IRRITATION AND ASPHYXIATION.

OSHA WARNING LABEL:

DANGER!
LONG-TERM SKIN EXPOSURE TO COMPONENTS OF THIS PRODUCT HAS CAUSED SKIN CANCER IN LABORATORY ANIMALS AND HUMANS.
REPEATED SKIN CONTACT TO SOME COMPONENTS IN THIS PRODUCT HAS PRODUCED SYSTEMIC TOXICITY (INCLUDING LIVER DAMAGE) IN LABORATORY ANIMALS.
MAY VENT HARMFUL CONCENTRATIONS OF HYDROGEN SULFIDE (H2S) GAS WHICH CAN CAUSE RESPIRATORY IRRITATION AND ASPHYXIATION.

CONSUMER WARNING LABEL:

A CONSUMER WARNING LABEL IS NOT APPLICABLE FOR THIS PRODUCT.

Inhalation: Exposure to vapor or mist may cause pulmonary irritation, dizziness, nausea and loss of consciousness. Significant concentrations of hydrogen sulfide gas can be present in the vapor space of storage tanks and bulk transport compartments (See Sections 7, 8 & 11).

Ingestion: Product would be expected to have a low order of acute toxicity. Significant ingestion of some components of this product may cause liver damage.

Skin contact: Prolonged and repeated liquid contact can cause dermatitis, folliculitis or oil acne. Components of this product may cause skin sensitization. Components of this product can cause liver damage if absorbed through the skin.

Eye contact: Liquid or vapor contact may result in slight eye irritation.

Carcinogenic Evaluation:

Product information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Marathon Residual Fuel Oil 68476-33-5	NE			

Notes: The International Agency for Research on Cancer (IARC) has determined that there is sufficient evidence for the carcinogenicity of residual (heavy) fuel oil in animals.

Component Information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:

Diesel Oil 68334-30-5	Monograph 45, 1989; (Overall evaluation upgraded from 3 to 2B with supporting evidence from other data relevant to the evaluation of carcinogenicity and its mechanisms)		A3 - Animal Carcinogen (as total hydrocarbons)	
5-methylchrysene 3697-24-3	Supplement 7, 1987; Monograph 32, 1983	Reasonably Anticipated To Be A Carcinogen (Listed under ``Polycyclic aromatic hydrocarbons``)		
Naphthalene 91-20-3	Monograph 82, 2002	Reasonably Anticipated To Be A Carcinogen Listed	A4 - Not Classifiable as a Human Carcinogen	Present
Benzo(a)phenanthrene 218-01-9	Supplement 7, 1987; Monograph 35, 1985	Known Carcinogen Reasonably Anticipated To Be A Carcinogen	A1 - Confirmed Human Carcinogen (as benzene soluble aerosol) A3 - Animal Carcinogen	Present

Notes:

The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of diesel fuel/fuel oil in humans. IARC determined that there was limited evidence for the carcinogenicity of marine diesel fuel in animals. Distillate (light) diesel fuels were not classifiable as to their carcinogeniicty to humans (Group 3A)

The International Agency for Research on Cancer (IARC) has determined that there is sufficient evidence for the carcinogenicity of catalytically cracked clarified oil (carbonblack feedstock) in animals.

The International Agency for Research on Cancer (IARC) and the National Toxicology Program (NTP) have concluded that certain polycyclic aromatic hydrocarbons, i.e. (benzo(a)pyrene, benz(a)anthracene, benzo(a)phenanthrene, indeno(1,2,3-cd)pyrene, benzo(j)fluoranthene, benzo(j,k,fluorine, benzo(g,h,i)perylene, and 5-methylchrysene are probably carcinogenic to humans (Group 2A and B).

The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that naphthalene could be a possible human carcinogen.

4. FIRST AID MEASURES

Inhalation: If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician. If symptoms or irritation occur with any exposure, call a physician.

Skin contact: Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.

Ingestion: Ingestion not likely. If swallowed, do not induce vomiting and do not give liquids. Immediately call a physician.

Eye contact: Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.

Medical conditions aggravated by exposure: Preexisting skin conditions, respiratory disorders, and impaired liver function may be aggravated by exposure to components of this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a combustible liquid per the OSHA Hazard Communication Standard and should be handled accordingly. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Special protective equipment for firefighters: Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Use water spray to cool exposed surfaces from as far a distance as possible. Keep run-off water out of sewers and water sources.

Flash point: 131 (Min) F
Autoignition temperature: No data available.
Flammable limits in air - lower (%): 1.0
Flammable limits in air - upper (%): 6.0

NFPA rating:
Health: 2
Flammability: 2
Reactivity: 1
Other: -

HMIS classification:
Health: 2
Flammability: 2
Reactivity: 1
Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return product to source.

7. HANDLING AND STORAGE

Handling:

Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues. The fuel oil contained in this product may flash if product temperature is >131 F.

Harmful concentrations of hydrogen sulfide (H2S) gas can accumulate in excavations and low-lying areas as well as the vapor space of storage and bulk transport compartments. Stay upwind and vent open hatches before unloading.

Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Never siphon this product by mouth.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation.

Respiratory protection:	Not required under normal conditions and adequate ventilation. Use atmosphere supplying respirators in confined spaces or when vapors exceed permissible limits; otherwise, an organic vapor respirator with pre-filter for fumes can be used. Self-contained breathing apparatus should be used for fire fighting.
Skin and body protection:	Impermeable gloves (e.g., nitrile, viton, tyvek/saranex 23) to prevent skin contact.
Eye protection:	Goggles and faceshield when handling hot material.
Hygiene measures:	Use mechanical ventilation equipment that is explosion-proof. Chemical resistant apron or other protective clothing may be needed to avoid skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance:	Black Viscous Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Mixture
Color:	Black
Odor:	Hydrocarbon
Molecular weight:	Not determined.
pH:	Neutral
Boiling point/range (5-95%):	400-1300 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.
Specific gravity:	Not determined
Density:	7.3-8.3 lbs/gal
Bulk density:	No data available.
Vapor density:	No data available.
Vapor pressure:	1 mm Hg @ 160 F
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	No data available.
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
Materials to avoid:	Strong oxidizers such as nitrates, chlorates, peroxides.
Conditions to avoid:	Sources of heat or ignition.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information:

Name	CAS Number	Inhalation:	Dermal:	Oral:
Marathon Residual Fuel Oil	68476-33-5	No data available	No data available	No data available

Lifetime skin painting studies in animals with products similar to Heavy catalytic cracked distillate, No. 6 fuel oil and/or its components have produced tumors in animals following prolonged and repeated skin contact. Repeated dermal application has produced severe irritation and systemic toxicity in subacute toxicity studies.

Summary of health effect data on residual fuel oil components:

This product contains diesel fuel (middle distillate) at a level of >1.0% Lifetime skin painting studies in animals with similar distillate fuels have produced weak to moderate carcinogenic activity following prolonged and repeated exposure. Similar middle distillates, when tested at nonirritating dose levels, did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not to dose. Repeated dermal application has produced severe irritation and systemic toxicity in subacute toxicity studies.

This product may contain >0.1% naphthalene. Exposure to naphthalene at 30 ppm for two years caused lung tumors in female mice. Male mice with the same exposure did not develop tumors. Exposure to 10-60 ppm naphthalene for 2 years caused tumors in the tissue lining of the nose and respiratory tract in male and female rats. Certain groups or individuals, i.e., infants, Semites, Arabs, Asians and Blacks, with a certain blood enzyme deficiency (glucose-6-phosphate dehydrogenase) are particularly susceptible to hemolytic agents and can rapidly develop hemolytic anemia and systemic poisoning from ingestion or inhalation of naphthalene.

Catalytic cracked clarified oil (CCCO) may be present in concentrations up to 100% in this product. Lifetime skin painting studies in animals with CCCO have produced tumors in animals following prolonged and repeated skin contact. Repeated dermal application of CCCO (30 mg/kg/day for 13 weeks) in rats resulted in anemia, liver degeneration and injury to bone marrow and lymphoid tissues. 100% mortality was observed at 2,000 mg/kg/day within three weeks. Repeated dermal application (30 mg/kg/day) of CCCO to pregnant rats during gestation produced maternal and fetal toxicity, some deaths and systemic toxicity (liver, thymus and blood). The number of viable offspring decreased at doses of 30 mg/kg/day and above. Many of the developmental effects (anomalies, resorptions and growth inhibition) were observed at doses which produced maternal toxicity. In a separate developmental study CCCO produced decreases in body weights and food consumption at doses from 10-250 mg/kg/day. Although fertility and reproductive function were not affected, the no observable adverse effect level for CCCO administered dermally was 1 mg/kg/day.

This product contains >0.1% 3-7 ring polynuclear aromatic hydrocarbons (PAC's). Some PAH's such as benzo(a)phenanthrene and 5-methylchrysene have been shown to be carcinogenic in experimental animals. An increased risk of cancer has been observed in workers employed in the aluminum production, coal gasification, coal-tar pitch, coke production and iron and steel industries that had been occupationally exposed to polynuclear aromatic hydrocarbons (PAC). Since these kinds of PACs have been measured at high levels in air samples taken in these idustries, IARC has concluded that these PACs are probably carcinogenic to humans.

Hydrogen sulfide gas (H2S) is toxic by inhalation. Prolonged breathing of 50-100 ppm H2S vapors can produce eye and respiratory tract irritation. Higher concentrations (250-600 ppm) for 15-30 minutes can produce headache, dizziness, nervousness, nausea and pulmonary edema or bronchial pneumonia. Concentrations of >1000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H2S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H2S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H2S, respectively. Over the years a number of acute cases of H2S poisonings have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects: Product can be toxic to fish and aquatic life. The 24 hour TLM of the water soluble fraction of bunker C fuel oil is 3-6 ppm in marine and estuarine crustaceans and fish.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations: This material as supplied and by itself, when discarded or disposed of, is not an EPA RCRA hazardous waste according to federal regulations. This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Fuel Oil, No. 6
UN/Identification No:	NA 1993
Hazard Class:	3
Packing group:	III
DOT reportable quantity (lbs):	Not applicable.

TDG (Canada):

Proper shipping name:	Fuel Oil, No. 6
UN/Identification No:	NA 1993
Hazard Class:	3
Packing group:	III
Regulated substances:	Not applicable.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Petroleum Residua	NA
Catalytic Cracked Clarified Oil	NA
Diesel Oil	NA
Sulfur Compounds	NA
5-methylchrysene	NA
Naphthalene	NA
Benzo(a)phenanthrene	NA
Hydrogen Sulfide	hydrogen sulfide

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Petroleum Residua	NA
Catalytic Cracked Clarified Oil	NA
Diesel Oil	NA
Sulfur Compounds	NA
5-methylchrysene	NA
Naphthalene	= 0.454 kg final RQ = 1 lb final RQ = 100 lb final RQ = 45.4 kg final RQ
Benzo(a)phenanthrene	= 0.454 kg final RQ = 0.454 kg statutory RQ = 1 lb final RQ = 1 lb statutory RQ = 100 lb final RQ = 45.4 kg final RQ
Hydrogen Sulfide	= 100 lb final RQ = 45.4 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313: This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Petroleum Residua	None
Catalytic Cracked Clarified Oil	None
Diesel Oil	None
Sulfur Compounds	None
5-methylchrysene	= 100 lb Reporting Threshold Chemical Category N590, PBT Chemicals = 100 lb Reporting Threshold Listed under ``Polycyclic aromatic compounds``, Chemical Category N590, PBT Chemicals
Naphthalene	= 0.1 % de minimis concentration
Benzo(a)phenanthrene	= 100 lb Reporting Threshold Chemical Category N590, PBT Chemicals = 100 lb Reporting Threshold Listed under ``Polycyclic aromatic compounds``, Chemical Category N590, PBT Chemicals
Hydrogen Sulfide	None

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Petroleum Residua

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Catalytic Cracked Clarified Oil

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Diesel Oil

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	[present]
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Sulfur Compounds

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed

Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

5-methylchrysene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	carcinogen; initial date 4/1/88
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	carcinogen; extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	[present]
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	SN 3758 (Polycyclic aromatic compounds category); Category Code N590; report 500 lbs. in combination of any listed chemicals SN 3758; Category Code N590
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Listed
New Jersey Right-To-Know:	Listed
Pennsylvania Right-To-Know:	Listed
Massachusetts Right-To Know:	Listed
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Listed
Illinois - Toxic Air Contaminants	Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Listed

Benzo(a)phenanthrene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	carcinogen; initial date 1/1/90
New Jersey Right-To-Know:	sn 0441
Pennsylvania Right-To-Know:	environmental hazard special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	carcinogen; extraordinarily hazardous

California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	[present]
New Jersey - Special Hazardous Substances:	carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 3758 (Polycyclic aromatic compounds category); Category Code N590; report 500 lbs. in combination of any listed chemicals SN 3758; Category Code N590
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 100 lbs Air RQ

Hydrogen Sulfide

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 1017
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Extraordinarily hazardous
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 1017
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 100 lbs Air RQ = 100 lbs Land/Water RQ

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Diesel Oil	B3; D2B	
5-methylchrysene		1% (English Item 1032, French Item 1124)
Naphthalene	B4, D2A	1 %
Benzo(a)phenanthrene	D2A Uncontrolled product according to WHMIS classification criteria.	0.1% (English Item 405, French Item 562) 0.1% (English Item 411, French Item 1721)
Hydrogen Sulfide	A; B1; D1A; D2B	1% (English Item 851, French Item 1550)

16. OTHER INFORMATION

Additional Information: The pronounced and easily-recognized rotten egg odor of hydrogen sulfide gas (H2S) can be detected at concentrations as low as 0.003-0.13 ppm. Since higher H2S concentrations (100-200 ppm) cause olfactory fatigue and other hydrocarbon odors can "mask" H2S, the sense of smell cannot be used as a reliable indicator of H2S exposure.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Petroleum Company LLC (MPC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MPC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

Material Safety Data Sheet

MSDS ID NO.: 0123MAR019
Revision date: 07/25/2006

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product name: Marathon Aviation Turbine Fuel Jet A 3000 ppm Sulfur Max
Synonym: Aviation Turbine Fuel Jet A; Jet A Aviation Fuel; AV Turbine Fuel - Jet A; Jet Fuel 500 ppm Sulfur Max; Jet Fuel (0.05% Sulfur Max); Jet Fuel, Non-Road Use, Undyed
Chemical Family: Petroleum Hydrocarbon
Formula: Mixture

Manufacturer:
Marathon Petroleum Company LLC
539 South Main Street
Findlay OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION / INFORMATION ON INGREDIENTS

Aviation Turbine Fuel Jet A is a complex mixture of paraffins, cycloparaffins, olefins and aromatic hydrocarbons having hydrocarbon chain lengths predominantly in the range of C9 through C16. May contain a trace amount of benzene (<0.01%).

Product information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Marathon Aviation Turbine Fuel Jet A	8008-20-6	100	= 200 mg/m³ TWA application restricted to conditions in which there are negligible aerosol exposures skin - potential for cutaneous absorption (as total hydrocarbon vapor)		

Component Information:

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Saturated Hydrocarbons	Mixture	70-80			
Aromatic Hydrocarbons	Mixture	17-20			
Unsaturated Hydrocarbons	Mixture	3-6			
Naphthalene	91-20-3	0.01-0.5	Skin - potential significant contribution to overall exposure by the cutaneous route = 10 ppm TWA = 15 ppm STEL	= 10 ppm TWA = 50 mg/m³ TWA = 15 ppm STEL = 75 mg/m³ STEL	

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

EMERGENCY OVERVIEW

JET FUEL IS A CLEAR TO AMBER COLORED LIQUID. THIS PRODUCT IS CONSIDERED TO BE A COMBUSTIBLE LIQUID PER THE OSHA HAZARD COMMUNICATION STANDARD AND SHOULD BE KEPT AWAY FROM HEAT, FLAME AND SOURCES OF IGNITION. NEVER SIPHON THIS PRODUCT BY MOUTH. IF SWALLOWED, THIS PRODUCT MAY GET SUCKED INTO THE LUNGS (ASPIRATED) AND CAUSE LUNG DAMAGE OR EVEN DEATH. PROLONGED OR REPEATED SKIN CONTACT CAN CAUSE DEFATTING AND DRYING OF THE SKIN WHICH MAY PRODUCE SEVERE IRRITATION OR DERMATITIS.

OSHA WARNING LABEL:

WARNING.
COMBUSTIBLE LIQUID.
ASPIRATION (INADVERTENT SUCTION) OF LIQUID INTO THE LUNGS CAN PRODUCE CHEMICAL PNEUMONIA OR EVEN DEATH.
PRODUCES SKIN IRRITATION UPON PROLONGED OR REPEATED CONTACT.

CONSUMER WARNING LABEL:

A CONSUMER WARNING LABEL IS NOT APPLICABLE FOR THIS PRODUCT.

Inhalation: Exposure to high vapor concentrations may produce headache, giddiness, vertigo, and anesthetic stupor.

Ingestion: Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin contact: Prolonged and repeated liquid contact can cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye contact: Produces little or no irritation on direct contact with the eye.

Carcinogenic Evaluation:

Product information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Marathon Aviation Turbine Fuel Jet A 8008-20-6	NE		A3 - Animal Carcinogen (as total hydrocarbon vapor)	

Notes: The International Agency for Research on Cancer (IARC) has determined that there is inadequate evidence for the carcinogenicity of jet fuel in humans.

IARC has determined that there is sufficient evidence for the carcinogenicity in experimental animals of diesel engine exhaust and extracts of diesel engine exhaust particles. IARC determined that there is only limited evidence for the carcinogenicity in humans of diesel engine exhaust. However, IARC's overall evaluation has resulted in the IARC designation of diesel engine exhaust as probably carcinogenic to humans (Group 2A) because of the presence of certain engine exhaust components.

Component Information:

Name	IARC Carcinogens:	NTP Carcinogens:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Naphthalene 91-20-3	Monograph 82, 2002	Reasonably Anticipated To Be A Carcinogen Listed	A4 - Not Classifiable as a Human Carcinogen	Present

Notes: The International Agency for Research on Cancer (IARC) and the Environmental Protection Agency (EPA) have determined that naphthalene could be a possible human carcinogen.

4. FIRST AID MEASURES

Inhalation: If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician. If symptoms or irritation occur with any exposure, call a physician.

Skin contact: Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.

Ingestion: If swallowed, do not induce vomiting and do not give liquids. If swallowed, immediately call a physician.

Eye contact: Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.

Medical conditions aggravated by exposure: Pre-existing skin conditions and respiratory disorders may be aggravated by exposures to components of this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a combustible liquid per the OSHA Hazard Communication Standard and should be handled accordingly. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 128.

Special protective equipment for firefighters: Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Keep surrounding area cool with water spray from a distance and prevent further ignition of combustible material. Keep run-off water out of sewers and water sources.

Flash point: 120-190 F
Autoignition temperature: 489 F
Flammable limits in air - lower (%): 0.7
Flammable limits in air - upper (%): 5.0

NFPA rating:
Health: 1
Flammability: 2
Reactivity: 1
Other: -

HMIS classification:
Health: 1
Flammability: 2
Reactivity: 1
Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling:

Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Avoid repeated and prolonged skin contact. Never siphon this product by mouth. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required when using at elevated temperatures that generate vapors or mists.

Respiratory protection: Use approved organic vapor chemical cartridge or supplied air respirators when material produces vapors that exceed permissible limits or excessive vapors are generated. Observe respirator protection factor criteria cited in ANSI Z88.2. Self-contained breathing apparatus should be used for fire fighting.

Skin and body protection: Neoprene, nitrile, polyvinyl alcohol (PVA), polyvinyl chloride and polyurethane gloves to prevent skin contact.

Eye protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.

Hygiene measures: No special protective clothing is normally required. Select protective clothing depending on industrial operations. Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance:	Clear to Amber Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Mixture
Color:	Clear or Amber
Odor:	Slight Hydrocarbon
Molecular weight:	180
pH:	Neutral
Boiling point/range (5-95%):	360-550 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.
Specific gravity:	Not determined
Density:	6.76 lbs/gal
Bulk density:	No data available.

Vapor density:	4-5
Vapor pressure:	1-10 mm Hg @ 100 F
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	10%
Viscosity:	1.3-2.1 @ 50 C

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Combustion produces carbon monoxide, aldehydes, aromatic and other hydrocarbons.
Materials to avoid:	Strong oxidizers such as nitrates, perchlorates, chlorine, fluorine.
Conditions to avoid:	Excessive heat, sources of igition and open flames.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information:

Name	CAS Number	Inhalation:	Dermal:	Oral:
Marathon Aviation Turbine Fuel Jet A	8008-20-6	>2 mg/l for 4 hr [Rat]	>5 ml/kg [Rabbit]	9-16 ml/kg [Rat]

Lifetime skin painting studies in animals with similar distillate fuels have produced weak to moderate carcinogenic activity following prolonged and repeated exposure. Similar middle distillates, when tested at nonirritating dose levels, did not show any significant carcinogenic activity indicating that this tumorigenic response is likely related to chronic irritation and not to dose. Repeated dermal application has produced severe irritation and systemic toxicity in subacute toxicity studies. Some components of this product, have been shown to produce a species specific, sex hormonal dependent kidney lesion in male rats from repeated oral or inhalation exposure. Subsequent research has shown that the kidney damage develops via the formation of a alpha-2µ-globulin, a mechanism unique to the male rat. Humans do not form alpha-2µ-globulin, therefore, the kidney effects resulting from this mechanism are not relevant in humans. Some components of this product were found to be positive in a few mutagenicity tests while negative in the majority of others. The exact relationship between these results and human health is not known.

Summary of health effect data on distillate fuel components:

This product may contain >0.1% naphthalene. Exposure to naphthalene at 30 ppm for two years caused lung tumors in female mice. Male mice with the same exposure did not develop tumors. Exposure to 10-60 ppm naphthalene for 2 years caused tumors in the tissue lining of the nose and respiratory tract in male and female rats. Oral administration of 133-267 mg/kg/day of naphthalene in mice for up to 90 days did not produce mortality, systemic toxicity, adversely affect organ or body weight or produce changes in blood. Repeated oral administration of naphthalene produced an anemia in dogs. Repeated intraperitoneal doses of naphthalene produced lung damage in mice. Repeated high doses of naphthalene has caused the formation of cataracts and retinotoxicity in the eyes of rats and rabbits due to accumulation of 1,2-naphthoquinone, a toxic metabolite. Effects in human eyes is uncertain and not well documented. Pregnant rats administered intraperitoneal doses of naphthalene during gestation gave birth to offspring that had delayed heart and bone development. Pregnant mice given near lethal doses of naphthalene showed no significant maternal toxicity and a reduction in the number of pups per litter, but no gross abnormalities in offspring. Suppressed spermatogenesis and progeny development have been reported in mice, rats and guinea pigs after exposure to high concentrations of naphthalene in their drinking water. Certain groups or individuals, i.e., infants, Semites, Arabs, Asians and Blacks, with a certain blood enzyme deficiency (glucose-6-phosphate dehydrogenase) are particularly susceptible to hemolytic agents and can rapidly develop hemolytic anemia and systemic poisoning from ingestion or inhalation of naphthalene.

Summary of health effect information on diesel engine exhaust:

Chronic inhalation studies of whole diesel engine exhaust in mice and rats produced a significant increase in lung tumors. Combustion of kerosine and/or diesel fuels produces gases and particulates which include carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur and hydrocarbons. Significant exposure to carbon monoxide vapors decreases the oxygen carrying capacity of the blood and may cause tissue hypoxia via formation of carboxyhemoglobin.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects:

Product can be toxic to aquatic life and cause fouling of the shoreline at high concentrations. The 96 hour LL50 values for an accomadated fraction (WAF) of fuel oil ranged from 3.2 to 65 mg/l in fish and 2-210 mg/l in invertebrates. EL50 values for inhibition of algal growth ranged from 1.8 to 2.9 mg/l for No. 2 fuel oil and from 10 to 78 mg/l for diesel fuel. This product does not concentrate or accumulate in the food chain. If released to soil and water, this product is expected to biodegrade under both aerobic and anaerobic conditions.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations:

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "characteristic" hazardous waste. This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Fuel, Aviation, Turbine Engine
UN/Identification No:	UN 1863
Hazard Class:	3
Packing group:	III
DOT reportable quantity (lbs):	Not applicable.

TDG (Canada):

Proper shipping name:	Fuel, Aviation, Turbine Engine
UN/Identification No:	UN 1863
Hazard Class:	3
Packing group:	III
Regulated substances:	Not applicable.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Naphthalene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Saturated Hydrocarbons	NA
Aromatic Hydrocarbons	NA
Unsaturated Hydrocarbons	NA
Naphthalene	= 0.454 kg final RQ = 1 lb final RQ = 100 lb final RQ = 45.4 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard
Fire Hazard

SARA Section 313: This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Saturated Hydrocarbons	None
Aromatic Hydrocarbons	None
Unsaturated Hydrocarbons	None
Naphthalene	= 0.1 % de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Saturated Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Aromatic Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.
Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Unsaturated Hydrocarbons

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	Not Listed.
Pennsylvania Right-To-Know:	Not Listed.

Massachusetts Right-To Know:	Not Listed.
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Not Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Listed
New Jersey Right-To-Know:	Listed
Pennsylvania Right-To-Know:	Listed
Massachusetts Right-To Know:	Listed
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Listed
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Listed
Illinois - Toxic Air Contaminants	Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Listed

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Naphthalene	B4, D2A	1 %

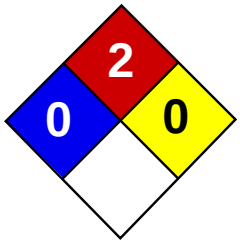
16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Petroleum Company LLC (MPC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MPC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet



Health	2
Fire	2
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Kerosene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Kerosene

Catalog Codes: SLK1048

CAS#: 8008-20-6 or 64742-81-0

RTECS: OA5500000

TSCA: TSCA 8(b) inventory: Kerosene

CI#: Not available.

Synonym: Astral Oil; Coal Oil, Fuel Oil No. 5, Deobase, Astral Oil, Jet A Fuel; Jet Fuel JP-1; JP-5 Navy Fuel; Kerosine, petroleum; Range Oil; K1 Kerosene; Kerosene, hydrodesulfurized; Kerosine

Chemical Name: Kerosene

Chemical Formula: Not available.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Kerosene	8008-20-6 or 64742-81-0	100

Toxicological Data on Ingredients: Kerosene: ORAL (LD50): Acute: 15000 mg/kg [Rat]. 20000 mg/kg [Guinea pig]. 2835 mg/kg [Rabbit].

Section 3: Hazards Identification

Potential Acute Health Effects:
Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator). Severe over-exposure can result in death.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to the nervous system. The substance may be toxic to blood, kidneys, liver, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do NOT induce vomiting. If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 210°C (410°F)

Flash Points: CLOSED CUP: 38°C (100.4°F). (Tagliabue.)

Flammable Limits: LOWER: 0.7% UPPER: 5% - 7%

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Flammable in presence of open flames and sparks, of heat.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water. Poisonous liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Oily liquid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: Not available.

Color: Yellow. Clear (Light.)

pH (1% soln/water): Not applicable.

Boiling Point: 149°C (300.2°F) - 325 C

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: 0.775 - .840(Water = 1)

Vapor Pressure: 0.1 kPa (@ 20°C)

Vapor Density: 4.5 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Insoluble in cold water, hot water. Miscible with other petroleum solvents

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (sparks, flames), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact.

Toxicity to Animals: Acute oral toxicity (LD50): 2835 mg/kg [Rabbit].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast. Causes damage to the following organs: the nervous system. May cause damage to the following organs: blood, kidneys, liver, central nervous system (CNS).

Other Toxic Effects on Humans:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation (lung irritant). Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material (mutagenic)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes moderate to severe skin irritation. It can cause defatting dermatitis. Eyes: May cause eye irritation. Inhalation: May cause respiratory tract and mucous membrane irritation and a burning sensation in the chest. Because of its relatively low volatility, overexposure by inhalation is uncommon, but it can occur in poorly ventilated areas or by inhalation of mists or aerosols. Symptoms of inhalation overexposure include central nevous system (CNS) depression (transient euphora, headache, irritability, excitement, ringing in the ears, weakness, incoordination, confusion, disorientation, drowsiness, tremor, somnolence, hallucinations, seizures, coma, death). May affect the heart (cardiac arrythmias), liver, kidneys, and respiration(asphyxia, apnea, acute pulmonary edema, dyspnea, fibrosis, or cyanosis) Ingestion: Causes gastrointestinal tract irritation with burning sensation in mouth, esophagus, and stomach, a b d o m i n a l p a i n , n a u s e a , v o m i t i n g , h y p e r m o t i l i t y , d i a r r h e a , h e a d a c h e , m a l a i s e . M a y a f f e c t respiration/ trachea/bronchi through accidental pulmonary aspiration which can cause hypoxia, chemical pneumonitis, and noncardiogenic pulmonary edema, pulmonary hemmorrhage, coughing, breathing difficulty, acute or chronic pulmonary edema, emphysema, respiratory stimulation. It may also affect the heart (dysrrhythmias, myocardial depression, tachycardia), liver, endocrine system (pancreas - hypoglycemia), behavior/central nervous system (symptoms similar to that of inhalation). Chronic Potential Health Effects: Inhalation: Repeated or prolonged inhalation may cause respiratory tract irritation and affect behavior/central nervous system with symptoms similar to that of acute inhalation. It may also affect the blood (changes in white blood cell count, changes in serum compositon, pigmented or nucleated red blood cells, leukopenia, normocytic anemia) , cardiovascular

system, respiratory system (trachea, bronchi), and may cause kidney damage. Ingestion: Repeated or prolonged ingestion may affect the liver, endocrine system (adrenal gland, pancreas, spleen), and metabolism (weight loss), and blood. Skin: Repeated or prolonged skin contact may cause defatting dermatitis, erythema, and eczema-like skin lesions, drying and cracking of the skin, and possible burns.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: Not available.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Kerosene UNNA: 1223 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Kerosene Rhode Island RTK hazardous substances: Kerosene Pennsylvania RTK: Kerosene Massachusetts RTK: Kerosene Massachusetts spill list: Kerosene New Jersey: Kerosene TSCA 8(b) inventory: Kerosene

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R10- Flammable. R65- Harmful: may cause lung damage if swallowed. S23- Do not breathe gas/fumes/vapour/spray S24- Avoid contact with skin. S62- If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 2

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 0

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:54 PM

Last Updated: 11/01/2010 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Material Safety Data Sheet

MSDS ID NO.: 0156MAR019
Revision date: 02/02/2004

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name: MAPLLC Benzene
Synonyms: Benzene; Cyclohexatriene;
Chemical Family: Aromatic Hydrocarbon
Formula: C6H6

Supplier:
Marathon Ashland Petroleum LLC
539 SOUTH MAIN STREET
FINDLAY OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

Benzene is an C6 aromatic petroleum hydrocarbon.

Product information

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
MAPLLC Benzene	71-43-2	100	= 0.5 ppm TWA = 2.5 ppm STEL skin - potential for cutaneous absorption	= 10 ppm TWA unless specified in 1910.1028 = 25 ppm Ceiling unless specified in 1910.1028 = 50 ppm STEL 10 min, unless specified in 1910.1028	OSHA Exposure Limit as specified in 1910.1028: =1.0 ppm TWA = 5 ppm STEL = 0.5 ppm Action Level

Component Information

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Benzene	71-43-2	99-100	= 0.5 ppm TWA = 2.5 ppm STEL skin - potential for cutaneous absorption	= 10 ppm TWA unless specified in 1910.1028 = 25 ppm Ceiling unless specified in 1910.1028 = 50 ppm STEL 10 min, unless specified in 1910.1028	OSHA Exposure Limit as specified in 1910.1028: =1.0 ppm TWA = 5 ppm STEL = 0.5 ppm Action Level

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

BENZENE IS A COLORLESS LIQUID WITH A STRONG HYDROCARBON ODOR. IT IS A VOLATILE AND EXTREMELY FLAMMABLE LIQUID THAT MAY CAUSE FLASH FIRES. KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME. CONTAINS BENZENE WHICH MAY CAUSE CANCER OR BE TOXIC TO BLOOD-FORMING ORGANS. NEVER SIPHON THIS PRODUCT BY MOUTH. IF SWALLOWED, THIS PRODUCT MAY GET SUCKED INTO THE LUNGS (ASPIRATED) AND CAUSE LUNG DAMAGE OR EVEN DEATH.

OSHA WARNING LABEL:

DANGER!
CONTAINS BENZENE.
CANCER HAZARD.
EXTREMELY FLAMMABLE.

CONSUMER WARNING LABEL:

A CONSUMER WARNING LABEL IS NOT APPLICABLE FOR THIS PRODUCT.

Inhalation: Acute exposure to vapor concentrations of 50-150 ppm benzene can cause respiratory irritation, headache, dizziness and loss of coordination. Concentrations exceeding 500 ppm may cause central nervous system depression, loss of consciousness, coma and death resulting from respiratory failure. Excessive benzene exposure may cause cardiac sensitization.

Ingestion: Liquid ingestion causes severe gastrointestinal pain, abdominal cramps, nausea, vomiting, narcosis and central nervous system depression. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin contact: Prolonged and repeated liquid contact can cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye contact: Eye irritation may result from contact with the liquid or exposure to the vapor at concentrations above the TLV.

Carcinogenic Evaluation:

Product information

Name	IARC:	NTP:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
MAPLLC Benzene 71-43-2	Supplement 7, 1987; Monograph 29, 1982	Known Carcinogen Reasonably Anticipated To Be A Carcinogen	A1 - Confirmed Human Carcinogen	Present

Notes: Benzene is listed by the National Toxicology Program, the International Agency for Research on Cancer (IARC) and by OSHA as a chemical casually associated with certain forms of leukemia (cancer) in humans.

Component Information

Name	IARC:	NTP:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Benzene 71-43-2	Supplement 7, 1987; Monograph 29, 1982	Known Carcinogen Reasonably Anticipated To Be A Carcinogen	A1 - Confirmed Human Carcinogen	Present

4. FIRST AID MEASURES

Inhalation:	If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician.
Skin contact:	Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.
Ingestion:	If swallowed, do not induce vomiting and do not give liquids. Immediately call a physician.
Eye contact:	Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.
Medical conditions aggravated by exposure:	Pre-existing skin conditions, respiratory disorders or impaired blood forming organ functions may be aggravated by exposure to this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media:	For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.
Specific hazards:	This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard, and should be handled accordingly. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 130.
Special protective equipment for firefighters:	Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Flash point:	12 F
Autoignition temperature:	1076 F
Flammable limits in air - lower (%):	1.3
Flammable limits in air - upper (%):	7.9

NFPA rating:
Health: 2
Flammability: 3
Reactivity: 1
Other: -

HMIS classification:
Health: 2
Flammability: 3
Reactivity: 1
Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling:

Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Never siphon this product by mouth. Avoid skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignitions without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required in an enclosed area or with inadequate ventilation.

Respiratory protection: Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the TLV or STEL. Observe respirator protection factor criteria cited in OSHA Benzene Standard (29 CFR 1910.1028). Self-contained breathing apparatus should be used for fire fighting.

Skin and body protection: Viton gloves should be used to prevent skin contact.

Eye protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.

Hygiene measures: Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance:	Colorless Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Pure
Color:	Colorless
Odor:	Aromatic
Molecular weight:	78.1
pH:	Neutral
Boiling point/range:	176 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.
Specific gravity:	0.88
Density:	7.32 lbs/gal
Bulk density:	No data available.
Vapor density:	2.8
Vapor pressure:	100 mm Hg @ 79 F
Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	No data available.
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Stability: The material is stable at 70 F, 760 mm pressure.

Polymerization: Will not occur.

Hazardous decomposition products: Carbon monoxide, benzene vapor

Materials to avoid: Strong oxidizers such as nitrates, chlorates, peroxides.

Conditions to avoid: Sources of heat or ignition.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information

Name	CAS Number	Inhalation:	Dermal:	Oral:
MAPLLC Benzene	71-43-2	LC50 = 13,700 ppm for 4 hrs [Rat]	LD50 > 8260 mg/kg [Rabbit]	LD50 = 810 - 10,000 mg/kg [Rat]

Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in man. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects: The 96 hour LC50 of benzene for stripped bass is 10-100 ppm. The 7 day No Observed Effect Concentration (NOEC) for benzene in daphnia is 3 mg/l. This product does not concentrate or accumulate in the food chain.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations: This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "ignitable" hazardous waste (D001). This product could also contain benzene at >0.5 ppm and could exhibit the characteristics of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name: Benzene
UN/Identification No: UN 1114
Hazard Class: 3
Packing group: II
DOT reportable quantity (lbs): 10 pounds.

TDG (Canada):

Proper shipping name: Benzene
UN/Identification No: UN 1114
Hazard Class: 3
Packing group: II
Regulated substances: 10 pounds.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Benzene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Benzene	= 0.454 kg final RQ = 0.454 kg statutory RQ = 1 lb final RQ = 1 lb statutory RQ = 10 lb final RQ = 10 lb final RQ receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule = 100 lb final RQ = 4.54 kg final RQ = 4.54 kg final RQ receives an adjustable RQ of 10 lbs based on potential carcinogenicity in August 14, 1989 final rule = 45.4 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard.
Chronic Health Hazard.
Fire Hazard.

SARA Section 313: This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Benzene	= 0.1 percent de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Benzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	carcinogen; initial date 2/27/87 developmental toxicity; initial date 12/26/97 male reproductive toxicity; initial date 12/26/97
New Jersey Right-To-Know:	sn 0197
Pennsylvania Right-To-Know:	environmental hazard; special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable, Carcinogen; skin
Michigan critical materials register list:	Annual usage threshold = 100 pounds
Massachusetts Extraordinarily Hazardous Substances:	carcinogen; extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	[present]
New Jersey - Special Hazardous Substances:	carcinogen; flammable - third degree; mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 10 lbs Air RQ

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or the Non Domestic Substance List (NDSL).

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Benzene	B2; D2A	0.1% (English Item 153, French Item 277)

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Ashland Petroleum LLC (MAPLLC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MAPLLC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

Material Safety Data Sheet

MSDS ID NO.: 0157MAR019
Revision date: 02/02/2004

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name: MAPLLC Toluene
Synonyms: Toluene; Toluol; Methyl Benzene
Chemical Family: Aromatic Hydrocarbon
Formula: C6H5(CH3)

Supplier:
Marathon Ashland Petroleum LLC
539 SOUTH MAIN STREET
FINDLAY OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

Toluene is an C7 aromatic petroleum hydrocarbon. Contains trace amounts of xylene (<0.1%), paraffins, cycloparaffins and benzene (<50 ppm).

Product information

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
MAPLLC Toluene	108-88-3	100	= 50 ppm TWA skin - potential for cutaneous absorption	= 100 ppm TWA = 150 ppm STEL = 375 mg/m³ TWA = 560 mg/m³ STEL	

Component Information

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Toluene	108-88-3	99-100	= 50 ppm TWA skin - potential for cutaneous absorption	= 100 ppm TWA = 150 ppm STEL = 375 mg/m³ TWA = 560 mg/m³ STEL	

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

TOLUENE IS A COLORLESS LIQUID WITH A STRONG HYDROCARBON ODOR. IT IS A VOLATILE AND EXTREMELY FLAMMABLE LIQUID THAT MAY CAUSE FLASH FIRES. KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME. NEVER SIPHON THIS PRODUCT BY MOUTH. IF SWALLOWED, THIS PRODUCT MAY GET SUCKED INTO THE LUNGS (ASPIRATED) AND CAUSE LUNG DAMAGE OR EVEN DEATH.

OSHA WARNING LABEL:

DANGER!
EXTREMELY FLAMMABLE.
ASPIRATION (INADVERTENT SUCTION) OF LIQUID INTO THE LUNGS CAN PRODUCE CHEMICAL PNEUMONIA OR EVEN DEATH.

CONSUMER WARNING LABEL:

A CONSUMER WARNING LABEL IS NOT APPLICABLE FOR THIS PRODUCT.

Inhalation: Overexposure or prolonged exposure to lower concentrations can cause respiratory irritation. Gross overexposure can cause central nervous system depression, producing symptoms of headache, dizziness, narcosis, and muscular incoordination. Excessive product exposure may cause cardiac sensitization.

Ingestion: Liquid ingestion causes severe gastrointestinal pain, abdominal cramps, nausea, vomiting, narcosis and central nervous system depression. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin contact: Prolonged and repeated liquid contact can cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye contact: Eye irritation may result from contact with the liquid or exposure to the vapor at concentrations above the TLV.

Carcinogenic Evaluation:

Product information

Name	IARC:	NTP:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
MAPLLC Toluene 108-88-3	NE		A4 - Not Classifiable as a Human Carcinogen	

Notes: The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for the carcinogenicity of toluene in either humans or animals (Group 3).

Component Information

Name	IARC:	NTP:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Toluene 108-88-3			A4 - Not Classifiable as a Human Carcinogen	

4. FIRST AID MEASURES

Inhalation: If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician.

Skin contact: Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.

Ingestion: If swallowed, do not induce vomiting and do not give liquids. Immediately call a physician.

Eye contact: Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.

Medical conditions aggravated by exposure: Pre-existing skin conditions and respiratory disorders may be aggravated by exposures to components of this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard, and should be handled accordingly. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 130.

Special protective equipment for firefighters: Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Flash point: 40 F
Autoignition temperature: 896 F
Flammable limits in air - lower (%): 1.2
Flammable limits in air - upper (%): 7.1

NFPA rating:
Health: 2
Flammability: 3
Reactivity: 1
Other: -

HMIS classification:
Health: 2
Flammability: 3
Reactivity: 1
Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling:

Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Never siphon this product by mouth. Avoid repeated and prolonged skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignitions without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures:	Local or general exhaust required in an enclosed area or with inadequate ventilation.
Respiratory protection:	Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the TLV or STEL. Observe respirator protection factor criteria cited in ANSI Z88.2. Self-contained breathing apparatus should be used for fire fighting.
Skin and body protection:	Viton gloves should be used to prevent skin contact.
Eye protection:	No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.
Hygiene measures:	Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance:	Colorless Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Pure
Color:	Colorless
Odor:	Aromatic
Molecular weight:	92.1
pH:	Neutral
Boiling point/range:	231 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.
Specific gravity:	0.87 @ 60 F
Density:	7.3 lbs/gal @ 60 F
Bulk density:	No data available.
Vapor density:	3.1
Vapor pressure:	21 mm Hg @ 68 F
Evaporation rate:	No data available.
Solubility:	515 mg/l at 20 C
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	No data available.
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Stability: The material is stable at 70 F, 760 mm pressure.

Polymerization: Will not occur.

Hazardous decomposition products: Carbon monoxide, toluene vapors

Materials to avoid: Strong oxidizers such as nitrates, chlorates, peroxides.

Conditions to avoid: Sources of heat or ignition.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information

Name	CAS Number	Inhalation:	Dermal:	Oral:
MAPLLC Toluene	108-88-3	LC50 = 3388-8800 ppm for 4 hrs [Rats]	LD50 = 14.1 ml/kg [Rabbit]	LD50 = 5.5-7.5 gm/kg [Rat]

Toluene was not carcinogenic in mice and rats exposed in a 2 year inhalation study for 6 hours/day, 5 days/week at concentrations of 600 or 1200 ppm.

Exposure to pregnant rats and mice during gestation to toluene produced some maternal and development toxicity (decreased fetal weight and increased sleletal variations). Toluene produced a mid frequency hearing loss in rats subchronically exposed to high concentrations of toluene. Decreased learning capability and deficits in operant behavior have been observed in animals subjected to exposure regimens that generally exceed established exposure limits.

Deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney and brain damage and central nervous system effects (incoordination, lassitude and memory loss) in individuals abusing toluene for its euphoric effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects: The 96 hour LC50 for toluene ranges from 5.4 to 26 mg/l in fathead minnow and salmon. The 48 hour ED50 for toluene is 11.5 mg/l in daphnia. The 96 hour No Observed Effect Concentration (NOEC) of toluene in algae is 10 mg/l. This product does not concentrate or accumulate in the food chain.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations: This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "ignitable" hazardous waste (D001). This product could also contain benzene at >0.5 ppm and could exhibit the characteristics of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Toluene
UN/Identification No:	UN 1294
Hazard Class:	3
Packing group:	II
DOT reportable quantity (lbs):	1000 pounds.

TDG (Canada):

Proper shipping name:	Toluene
UN/Identification No:	UN 1294
Hazard Class:	3
Packing group:	II
Regulated substances:	1000 pounds.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Toluene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Toluene	= 0.454 kg final RQ = 1 lb final RQ = 10 lb final RQ = 100 lb final RQ = 1000 lb final RQ = 4.54 kg final RQ = 45.4 kg final RQ = 454 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard.
Fire Hazard.

SARA Section 313: This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Toluene	= 1.0 percent de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Toluene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	developmental toxicity; initial date 1/1/91
New Jersey Right-To-Know:	sn 1866
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable; skin
Michigan critical materials register list:	Annual usage threshold = 100 pounds
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1866
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 1,000 lbs Air RQ

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or the Non Domestic Substance List (NDSL).

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Toluene	B2; D2A	1% (English Item 1578, French Item 1622)

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Ashland Petroleum LLC (MAPLLC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MAPLLC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

Material Safety Data Sheet

MSDS ID NO.: 0158MAR019
Revision date: 02/02/2004

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name: MAPLLC Xylene
Synonyms: Xylene; Mixed Xylenes, Dimethyl Benzene; Methyl Toluene
Chemical Family: Aromatic Hydrocarbon
Formula: C6H4(CH3)2

Supplier:
Marathon Ashland Petroleum LLC
539 SOUTH MAIN STREET
FINDLAY OH 45840

Other information: 419-421-3070
Emergency telephone number: 877-627-5463

2. COMPOSITION/INFORMATION ON INGREDIENTS

Xylene is an mixture of C8 aromatic petroleum hydrocarbons composed of the three isomers of xylene (ortho, meta & para) and ethylbenzene. Contains trace amounts of toluene, C9 hydrocarbons and benzene (<50 ppm).

Product information

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
MAPLLC Xylene	1330-20-7	100	= 100 ppm TWA = 150 ppm STEL	= 100 ppm TWA = 150 ppm STEL = 435 mg/m³ TWA = 655 mg/m³ STEL	

Component Information

Name	CAS Number	Weight %	ACGIH Exposure Limits:	OSHA - Vacated PELs - Time Weighted Ave	Other:
Xylene	1330-20-7	85	= 100 ppm TWA = 150 ppm STEL	= 100 ppm TWA = 150 ppm STEL = 435 mg/m³ TWA = 655 mg/m³ STEL	
Ethyl Benzene	100-41-4	15	= 100 ppm TWA = 125 ppm STEL	= 100 ppm TWA = 125 ppm STEL = 435 mg/m³ TWA = 545 mg/m³ STEL	

Notes: The manufacturer has voluntarily elected to reflect exposure limits contained in OSHA's 1989 air contaminants standard in its MSDS's, even though certain of those exposure limits were vacated in 1992.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

XYLENE IS A COLORLESS LIQUID WITH A STRONG HYDROCARBON ODOR. IT IS A VOLATILE AND EXTREMELY FLAMMABLE LIQUID THAT MAY CAUSE FLASH FIRES. KEEP AWAY FROM HEAT, SPARKS AND OPEN FLAME. CONTAINS ETHYLBENZENE THAT HAS PRODUCED CANCER IN LABORATORY ANIMALS. NEVER SIPHON THIS PRODUCT BY MOUTH. IF SWALLOWED, THIS PRODUCT MAY GET SUCKED INTO THE LUNGS (ASPIRATED) AND CAUSE LUNG DAMAGE OR EVEN DEATH. CONTACT MAY CAUSE EYE AND SKIN IRRITATION.

OSHA WARNING LABEL:

DANGER!
FLAMMABLE LIQUID.
MAY CAUSE EYE OR SKIN IRRITATION.
CONTAINS ETHYLBENZENE THAT HAS CAUSED CANCER IN LABORATORY ANIMALS.
ASPIRATION (INADVERTENT SUCTION) OF LIQUID INTO THE LUNGS CAN PRODUCE CHEMICAL PNEUMONIA OR EVEN DEATH.

CONSUMER WARNING LABEL:

A CONSUMER WARNING LABEL IS NOT APPLICABLE FOR THIS PRODUCT.

Inhalation: Overexposure or prolonged exposure to lower concentrations can cause respiratory irritation. Gross overexposure can cause central nervous system depression, producing symptoms of headache, dizziness, narcosis, and muscular incoordination. Excessive product exposure may cause cardiac sensitization.

Ingestion: Liquid ingestion causes severe gastrointestinal pain, abdominal cramps, nausea, vomiting, narcosis and central nervous system depression. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema/hemorrhage and even death.

Skin contact: Prolonged and repeated liquid contact can cause defatting and drying of the skin and can lead to irritation and/or dermatitis.

Eye contact: Liquid contact will produce a burning sensation and irritation in the eye. Eye irritation, photophobia and reversible corneal vacuolization may occur from vapor exposure above the TLV.

Carcinogenic Evaluation:

Product information

Name	IARC:	NTP:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
MAPLLC Xylene 1330-20-7	NE		A4 - Not Classifiable as a Human Carcinogen	

Notes: The International Agency for Research on Cancer (IARC) has concluded that there is inadequate evidence for the carcinogenicity of xylene in either humans or animals (Group 3).

Component Information

Name	IARC:	NTP:	ACGIH - Carcinogens:	OSHA - Select Carcinogens:
Xylene 1330-20-7			A4 - Not Classifiable as a Human Carcinogen	
Ethyl Benzene 100-41-4	Monograph 77, 2000		A3 - Animal Carcinogen	

Notes: The International Agency for Research on Cancer (IARC) has concluded that ethyl benzene is possibly carcinogenic to humans (Group 2B).

4. FIRST AID MEASURES

Inhalation: If affected, move person to fresh air. If breathing is difficult, administer oxygen. If not breathing or if no heartbeat, give artificial respiration or cardiopulmonary resuscitation (CPR). Immediately call a physician.

Skin contact: Wash with soap and large amounts of water. Remove contaminated clothing. If symptoms or irritation occur, call a physician.

Ingestion: If swallowed, do not induce vomiting and do not give liquids. Immediately call a physician.

Eye contact: Flush eyes with large amounts of tepid water for at least 15 minutes. If symptoms or irritation occur, call a physician.

Medical conditions aggravated by exposure: Preexisting skin, eye and respiratory disorders may be aggravated by exposure to components of this product.

5. FIRE FIGHTING MEASURES

Suitable extinguishing media: For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFT/ATC) can be used. Fire fighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard, and should be handled accordingly. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the North American Emergency Response Guide 130.

Special protective equipment for firefighters: Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Flash point: 86-93 F
Autoignition temperature: 867-984 F
Flammable limits in air - lower (%): 1.1
Flammable limits in air - upper (%): 7.0

NFPA rating:
Health: 2
Flammability: 3
Reactivity: 1
Other: -

HMIS classification:
Health: 2
Flammability: 3
Reactivity: 1
Special: *See Section 8 for guidance in selection of personal protective equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. Advise authorities and National Response Center (800-424-8802) if substance has entered a watercourse or sewer. Notify local health and pollution control agencies, if appropriate. Contain liquid with sand or soil. Recover and return free product to proper containers. Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids.

7. HANDLING AND STORAGE

Handling:

Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices. Store in properly closed containers that are appropriately labeled and in a cool well-ventilated area. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Do not cut, drill, grind or weld on empty containers since they may contain explosive residues.

Never siphon this product by mouth. Avoid repeated and prolonged skin contact. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignitions without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

PERSONAL PROTECTIVE EQUIPMENT

Engineering measures: Local or general exhaust required in an enclosed area or with inadequate ventilation.

Respiratory protection: Approved organic vapor chemical cartridge or supplied air respirators should be worn for exposures to any components exceeding the TLV or STEL. Observe respirator protection factor criteria cited in ANSI Z88.2.

Skin and body protection: Viton gloves should be used to prevent skin contact.

Eye protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields.

Hygiene measures: Use mechanical ventilation equipment that is explosion-proof.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Appearance:	Colorless Liquid
Physical state (Solid/Liquid/Gas):	Liquid
Substance type (Pure/Mixture):	Mixture
Color:	Colorless
Odor:	Sweet Aromatic
Molecular weight:	106.1
pH:	Neutral
Boiling point/range:	280-291 F
Melting point/range:	Not determined.
Decomposition temperature:	Not applicable.
Specific gravity:	0.86 @ 60 F
Density:	7.2 lbs/ gal
Bulk density:	No data available.
Vapor density:	3.7
Vapor pressure:	6-16 mm Hg @ 68 F

Evaporation rate:	No data available.
Solubility:	Negligible
Solubility in other solvents:	No data available.
Partition coefficient (n-octanol/water):	No data available.
VOC content(%):	No data available.
Viscosity:	No data available.

10. STABILITY AND REACTIVITY

Stability:	The material is stable at 70 F, 760 mm pressure.
Polymerization:	Will not occur.
Hazardous decomposition products:	Carbon monoxide, xylene vapors
Materials to avoid:	Strong oxidizers such as nitrates, chlorates, peroxides.
Conditions to avoid:	Sources of heat or ignition.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Product information

Name	CAS Number	Inhalation:	Dermal:	Oral:
MAPLLC Xylene	1330-20-7	LC50 = 5,267-6,700 ppm 4-6 hrs [Rats/Mice]	LD50 > 4 gm/kg [Rabbits]	LD50 = 2.5 - 10 ml/kg [Rats]

Laboratory animals exposed to high doses of xylene showed evidence of effects in the liver, kidneys, lungs, spleen, heart and adrenals. Exposure of pregnant rats, mice and rabbits during gestation to significant concentrations of xylene produced maternal, fetal and developmental toxicity (skeletal retardation, cleft palate, and wavy ribs) generally at maternally toxic doses. These types of fetotoxic effects have been associated with maternal toxicity. Repeated inhalation of high xylene concentrations have shown impairment of performance abilities (behavioral tests) in animals and man. Xylene produced a mid frequency hearing loss in rats subchronically exposed to high concentrations of xylene.

Gross overexposure or severe poisoning incidents in humans to xylenes has been reported to cause lung, liver, kidney, heart and brain damage as well as neurologic disturbances.

The product contains >1.0% ethyl benzene (EB). Rats and mice exposed to 750 ppm EB for 6 hours/day, 5 days/week for two years developed kidney tumors in male and femmale rats and lung tumors in male mice and liver tumor in female mice.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects: The 96 hour LC50 for xylene isomers range from 2.6-28 mg/l in flathead minnow and rainbow trout. The 24 hour ED50 for xylene ranges from 1.0-3.6 mg/l in daphnia. The 192 hour EC50 for xylene ranges from 3.9-4.4 mg/l in algae. This product does not concentrate or accumulate in the food chain.

13. DISPOSAL CONSIDERATIONS

Cleanup Considerations:

This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of an "ignitable" hazardous waste (D001). This product could also contain benzene at >0.5 ppm and could exhibit the characteristics of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with a hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

14. TRANSPORT INFORMATION

49 CFR 172.101:

DOT:

Transport Information: This material when transported via US commerce would be regulated by DOT Regulations.

Proper shipping name:	Xylenes
UN/Identification No:	UN 1307
Hazard Class:	3
Packing group:	III
DOT reportable quantity (lbs):	1000 pounds.

TDG (Canada):

Proper shipping name:	Xylenes
UN/Identification No:	UN 1307
Hazard Class:	3
Packing group:	III
Regulated substances:	1000 pounds.

15. REGULATORY INFORMATION

Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

OSHA Hazard Communication Standard: This product has been evaluated and determined to be hazardous as defined in OSHA's Hazard Communication Standard.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product contains the following component(s) that have been listed on EPA's Extremely Hazardous Substance (EHS) List:

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Xylene	NA
Ethyl Benzene	NA

SARA Section 304: This product contains the following component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	CERCLA/SARA - Hazardous Substances and their Reportable Quantities
Xylene	= 100 lb final RQ = 45.4 kg final RQ
Ethyl Benzene	= 100 lb final RQ = 1000 lb final RQ = 45.4 kg final RQ = 454 kg final RQ

SARA Section 311/312: The following EPA hazard categories apply to this product:

Acute Health Hazard.
Fire Hazard.
Chronic Health Hazard.

SARA Section 313: This product contains the following component(s) that may be subject to reporting on the Toxic Release Inventory (TRI) From R:

Name	CERCLA/SARA 313 Emission reporting:
Xylene	= 1.0 percent de minimis concentration
Ethyl Benzene	= 0.1 percent de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Xylene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 2014
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable
Michigan critical materials register list:	Annual usage threshold = 100 pounds (all isomers)
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 2014
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 1,000 lbs Air RQ

Ethyl Benzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	sn 0851
Pennsylvania Right-To-Know:	environmental hazard
Massachusetts Right-To Know:	Present
Florida substance List:	Not Listed.
Rhode Island Right-To-Know:	Toxic, Flammable
Michigan critical materials register list:	Not Listed.
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	flammable - third degree

New Jersey - Environmental Hazardous Substances List:	SN 0851
Illinois - Toxic Air Contaminants	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	= 1 lb Land/Water RQ = 1,000 lbs Air RQ

Canadian Regulatory Information:

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or the Non Domestic Substance List (NDSL).

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Xylene	B2; D2A; D2B	
Ethyl Benzene	B2; D2A; D2B	0.1% (English Item 697, French Item 854)

16. OTHER INFORMATION

Additional Information: No data available.

Prepared by: Craig M. Parker Manager, Toxicology and Product Safety

The information and recommendations contained herein are based upon tests believed to be reliable. However, Marathon Ashland Petroleum LLC (MAPLLC) does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage maybe required. MAPLLC assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied.

End of Safety Data Sheet

APPENDIX C

Job Safety Analysis (JSA) Form

TRC
JOB SAFETY/ENVIRONMENTAL ANALYSIS (JSA)

JOB SAFETY ANALYSIS (JSA) **JOB:** **DATE:**

SITE: **JSA#**

PROJECT COORDINATOR: **CONTRACTOR(S):** TRC
SUBCONTRACTORS:

JSA TEAM:
Project Manager/Supervisor: _____ Phone: _____
EHS Field Safety Advisor: _____ Phone: _____
Site Safety Officer: _____ Phone: _____
Alternate Site Safety Officer: _____ Phone: _____

PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIRED: Hard Hat, Steel-Toed Boots, Safety Glasses, Traffic Safety Vest, Gloves, and Hearing Protection. Respiratory Protection (if required).
ADDITIONAL PPE:

Steps in Sequence	Hazards Involved	Recommendations for Safe Work
1)	•	•
2)	•	•
3)	•	•
4)	•	•
5)	•	•
6)	•	•
7)	•	•
8)	•	•

Approvals:

Site Safety Officer:	**Date:**	**Project Manager/Supervisor:**	**Date:**
_____	_____	_____	_____
EHS Field Safety Advisor:	**Date:**	**Alternate Site Safety Officer:**	**Date:**
_____	_____	_____	_____

Field Changes:

Steps in Sequence	Hazards Involved	Recommendations for Safe Work
1)	•	•
2)	•	•
3)	•	•
4)	•	•
5)	•	•

APPENDIX D

Safety Task Analysis Review (STAR) Form

Identify Potential Hazards

☐ Abrasions
☐ Biological Hazards (plants, animals, insects)
☐ Cave-in (trench/excavation work)
☐ Chemical/Thermal Burn
☐ Cuts
☐ Dermatitis
☐ Dropping Materials/Tools to lower level
☐ Drowning/Flowing water
☐ Dust
☐ Electrical Shock
☐ Elevated/Overhead Work
☐ Energized Equipment
☐ Fire
☐ Flammability
☐ Foreign body in eye
☐ Hazardous materials (exposure or release)
☐ Heat or Cold Stress
☐ Heavy Equipment Operation
☐ Heavy Lifting
☐ High Noise Levels
☐ Impact Noise
☐ Inability to maintain communication
☐ Inclement weather
☐ Overhead work
☐ Overhead utilities
☐ Underground Utilities
☐ Pinch points
☐ Pressurized lines
☐ Slips, Trips, Falls
☐ Sprains/Strains
☐ Traffic
☐ Confined Space
☐ New or Rental Equipment
☐ Surface Water Run-On/Run-Off
☐ Odor/VOC Emissions
☐ Compressed Gas Cylinders
☐ Generated Wastes (solids/liquids)
☐ Known/Unknown Visitors
☐ Visibility
☐ New Personnel
☐ Hoists/Rigging/Slings/Wire Rope
☐ Special Operations/Instructions (attach)
☐ Ergonomics

Identify Controls

☐ Air Monitoring
☐ Barricades/Fencing/Silt Fencing
☐ Buddy System
☐ Appropriate Clothing/Monitoring of Weather
☐ Confined Space Procedures
☐ Decontamination
☐ Drinking Water/Fluids
☐ Dust abatement Measures
☐ Equipment inspection
☐ Exclusion zones
☐ Exhaust ventilation
☐ Fall Protection
☐ Fire extinguisher/Fire watch
☐ Flotation Devices/Lifelines
☐ Grounds on Equipment/Tanks
☐ Ground Fault Interrupter
☐ Ground Hydraulic Attachments
☐ Hand signal communication
☐ Hazardous/Flammable material storage
☐ Hazardous Plant/Animal Training
☐ Hearing Protection (Specify)
☐ Hoses, Access to water
☐ Hot Work Procedures
☐ Insect Repellent or Precautions
☐ Isolation of Equipment or Process (LO/TO)
☐ Storm-water Control Procedures/Methods
☐ Machine/Equipment Guarding
☐ Manual Lifting Equipment (Chain Falls)
☐ Protective Equipment (specify)
☐ Proper lifting techniques
☐ Proper tool for Job
☐ Radio Communication
☐ Respirator, (specify type)
☐ Safety Harness/Lanyard/Scaffold
☐ Sloping, Shoring, Trench Box
☐ Vehicle Inspection
☐ Spill Prevention Measures/Spill Kits
☐ Equipment Manuals/Training
☐ Emergency Procedures/Incident Management Plan
☐ Appropriate Labels/Signage
☐ Derived Waste Management Plan
☐ Visitor Escort/Orientation/Security
☐ Window Cleaning/Defrost
☐ Proper Work Position/Tools

Pre-Task Review (Yes/No/NA)

1. Has Job Hazard Analysis been completed and reviewed? _____
2. Is Job Scope understood by all Personnel? _____
3. Proper Safety Equipment on job site? ___
4. Permit Issues?
   What type? ☐ Hot Work
   ☐ Confined Space ☐ Excavation
   ☐ Other:_____
5. Proper Tools for Job on site? _____
6. Oxygen/Flammability checked? _____
7. Reviewed MSDSs for any hazardous substance that might be present? _____
8. Proper training for all personnel? _____
9. Are there any planned deviations from set procedures for equipment modifications? __ If so, contact supervisor to check applicability of MOC procedures.
10. Is there any work planned that could cause activation of emergency procedures? ___ If so, have these procedures been discussed and communicated?

Post-Task Review

1. Work area cleaned up?_____
2. All locks and tags removed and signed off by individuals?_____
3. Have Permits been turned in? _____
4. STAR submitted to EHS Department?
5. Were there any unplanned deviations from set procedures or equipment modifications? _____
   If so, contact supervisor to check applicability of MOC procedures.

Safety Task Analysis Review

Task Description:_____

List Tasks:

Company: _____

Completed By: _____

Date: _____

Job Location:_____

List Additional Hazards (Hazards Not Shown with Check Box)

List Additional Contorls (Controls Not Shown with Check Box)

Tailgate Meeting Topic

Signatures of Personnel on Task Analysis Review/Tailgate Meeting:

Mentor Assigned to Work

Lessons Learned (Based on changes in conditions (Near-Incidents/ Observations, Potential Emergencies)

Is there a better/safer way to perform the work/task?

Supervisor Review (date/Time): _____

EHS Review (date/time):_____

Comments:_____

APPENDIX E

Air Monitoring Forms

Air Quality Monitoring Record

Client:______________________________ **Project No.**:_________________________
Location:___________________________ **Site Eng.**:___________________________
Project Mgr.:________________________ **Site H&S Ofcr.**:______________________

Date	Initial	Time	Location	PID/FID PPM	O_2%	LEL%	Dräeger Tubes			Other
							______ ______	______ ______	______ ______	

Field Equipment Calibration/Maintenance Log

Client:_____ **Project No.**:_____
Location:_____ **Site Eng.**:_____
Project Mgr.:_____ **Site EHS Off.**:_____

Date	Type of Equipment[1]	Equipment ID Number	Procedure[2]	Reference Standards[3]	Initials of Individual	Company	Calibration OK Yes/No

Maintenance Required/Procedures:_____

[1]Certifications or statements of manufacturer calibration can be obtained from RETEC office files.

[2] Use space below if necessary

[3] Type of calibration gas used and concentration; buffer solutions, etc.

APPENDIX F

Map/Route to the Nearest Hospital

Driving Directions from the Site (Former Falcon Refinery (1.7 miles southeast of State Highway 361 near the intersection of FM 2725 and Bishop Road, Ingleside, San Patricio County, Texas) to Care Regional Medical Center, 1711 West Wheeler Avenue, Aransas Pass, Texas 78336. Phone: (361) 758-8585

1. Head northeast on Farm to Market Rd 2725 toward Co Rd 146/Sunray Rd. 0.3 mi
2. Take the 1st left onto Co Rd 146/Sunray Rd. 0.9 mi
3. Continue onto Highland St. 0.4 mi
4. Turn right onto Ave A. 3.5 mi
5. Turn right onto W Wheeler Ave Destination will be on the right. 367 ft

APPENDIX G

TRC Incident Report Form

DATE OF INCIDENT (D.O.I.):_____
(Month/Day/Year)
(xx/xx/xx)

TRC
Incident Report

(To be completed by Employee's Supervisor and by Employee involved in the Incident/Accident immediately after an Injury or Illness/Incident/Accident)

Incident Category:

☐ Employee Injury ☐ Property Damage ☐ Vehicle Damage ☐ Fire ☐ Near Miss ☐ Other
Incident Location:
Site Identification/Project No./WNO No:

Site Address:	
Date Incident Occurred:	
Time Incident Occurred:	
Date Incident Reported:	
Time Incident Reported:	
Customer Project Manager:	

Employee Information:

Name:		
Field Office/Address:		
Supervisor Name/Phone:		
Employee Phone/Cell:		
Title or Occupation:		
Department:		

Type of Employee Injury or Illness:

☐ First Aid Only ☐ Medical Treatment Only ☐ Restricted Work-case ☐ Lost Workday ☐ Extended Time Away From Work (3 days or more) ☐ Fatality

Estimated Number of Days on Restricted Work:	
Estimated Number of Days Away from Work:	

Employee Injury or Illness Description:

Describe the Injury or Illness:
First Aid/Medical Treatment Administered:
Name of Doctor's Office, Clinic, or Hospital:
Address and Phone Number:

Incident Description:

Equipment Involved:
Site Type: (Marketing, Refinery, etc.)
What task was being performed at time of incident?
Describe Incident in Detail :
Conditions at time of Incident: (weather, lighting):

DATE OF INCIDENT (D.O.I.):_____
(Month/Day/Year)
(xx/xx/xx)

Non-TRC Involvement:

Subcontractor Involved: ☐ No ☐ Yes
Name of Company:
Address:
Contact Name and Phone Number:
Additional Information:
Witnesses(s) to Incident: ☐ No ☐ Yes
Name(s) and Address(s):
Phone Number(s):
Additional Information:

Personal Protective Equipment (PPE):

List PPE required to complete the task: (glasses, safe. shoes, hard hat, respirator, hearing protection, etc.)
Was the employee using the proper PPE at the time of the Incident?

Safety Violation ☐ No ☐ Yes (Explain):

State the company safety rule, OSHA regulation, or specific training that was violated:
Describe the training the employee received to prevent this violation:

Immediate Corrective Actions:

Describe the immediate corrective actions taken:	
Signature of Investigating Supervisor:	**Date:**
Signature of Employee:	**Date:**

TRC Safety Manager/Director Signature: _____Date:_____